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UNCLASSIFIED

For determining fastness to washing

ATLAS

Launder-Ometer



ATLAS ELECTRIC DEVICES CO. • CHICAGO 10, ILLINOIS, U. S. A.

NEW ADDRESS

4114 NORTH RAVENSWOOD AVENUE

UNCLASSIFIED

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THE LAUNDER-OMETER*

The Standard Machine for Laboratory Washing Tests

Officially advocated
Instrument of The
American Association
of Textile Chem-
ists and Colorists.

Also approved by
and called for in
Governmental speci-
fications, A.S.T.M.,
A.S.A. and other
U.S. engineering and
technical societies;
also similiar organi-
zations in other
countries through-
out the world.



The Launder-Ometer
is an electrically op-
erated Laboratory
Testing Machine of
20 specimen capac-
ity for quickly mak-
ing reliable and re-
producible tests on
textiles, soaps, deter-
gents and other ma-
terials and chemicals
requiring mechanical
action under con-
trolled conditions of
agitation and tem-
perature.

*Trade Mark Reg.

Atlas Electric Devices Co.

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Representatives:

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BOSTON CHARLOTTE LOS ANGELES SAN FRANCISCO
SEATTLE PORTLAND ALL PRINCIPAL NATIONS

THE LAUNDER-OMETER—WHAT IT IS AND WHAT IT DOES

The Launder-Ometer is the standard laboratory washing machine of the American Association of Textile Chemists and Colorists and is used throughout the world for quickly determining in the laboratory on textiles and related products the

**COLORFASTNESS TO COMMERCIAL
LAUNDERING AND DOMESTIC
WASHING**

COLORFASTNESS TO DRY CLEANING

**COLORFASTNESS TO CHLORINE
BLEACHING**

**COLORFASTNESS TO MILL WASHING
AND SCOURING**

COLORFASTNESS TO FULLING

RESISTANCE TO BLEEDING

DETERGENCY EVALUATIONS

LEATHER AND TEXTILE DYEING

**MISCELLANEOUS OTHER TESTS RE-
QUIRING CONTROLLED AGITATION
UNDER CONSTANT TEMPERATURE.**

CORRELATION

To be of maximum value laboratory test results must be rapid, reliable, reproducible both in the same laboratory and from laboratory to laboratory and must correlate with actual service performance. The standard methods of test when used with the Launder-Ometer provide such results.

INSURES BETTER PRODUCTS

In the manufacture, sale and purchase of practically all textiles, changes in color and dimensions due to washing or dry cleaning are all important factors. More and more the general public as well as industrial and governmental purchasing agencies are insisting on merchandise which will withstand multiple launderings or dry cleanings without the loss or change of color to such a degree as to render the article unserviceable.

The Launder-Ometer quickly provides all concerned with such information in advance without the necessity of waiting for service reports after the merchandise has been sold.

PRODUCT DEVELOPMENT

Dependable advance knowledge of colorfastness to washing or dry cleaning of a new shade or product under the actual method by which it will be processed is of invaluable aid to the manufacturer. In selecting the dyestuffs to produce a new shade or to improve a standard product it is important to determine the colorfastness to laundering and dry cleaning of the product produced under the method of application that will be actually utilized.

While each of a group of dyestuffs may have a particular colorfastness rating when applied singly under one method of application it is important to know that the shade resulting from the combination and Method of Prepare will have the desired colorfastness and will not fade or go off tone after multiple launderings or dry cleanings. Such information can easily be determined by a short test in the Launder-Ometer in advance of production.

QUALITY CONTROL

By providing information on the loss of color that will be encountered in five commercial launderings or home washings in one 45-minute test the Launder-Ometer is effectively used as a control on production. Periodic sampling of production will quickly detect poor penetration or other malfunctions in processing and permit immediate correction before large quantities of materials are processed and leave the mill.

BUILDS REPUTATIONS

In an enviable position indeed is the company or product whose name is synonymous with quality at the consumer level. Advertising and sales promotion can create an interest and put a company name or product over initially but quality of merchandise is necessary to build and sustain a reputation. Any testing program which determines the quality of products before production is started and again checks the finished product before shipment is fundamentally sound and such honest effort will be rewarded with greater sales and increased prestige. Many Launder-Ometer users have found their competitive position so improved that public announcements have been made and whole advertising programs built around their guarantee of quality based on the use of the Launder-Ometer.

INSURES ACCEPTANCE

The use of a Launder-Ometer provides the supplier with advance information that material supplied under contracts will meet acceptance requirements for colorfastness to washing since most government and industrial specifications are based on standard tests made in the Launder-Ometer.

ATLAS ELECTRIC DEVICES COMPANY

WASHING TESTS

The Launder-Ometer is fundamentally a laboratory device for conducting washfastness tests and it is for this purpose it finds its greatest usefulness. A complete description of the various standard and accelerated colorfastness to commercial laundering and home washing tests will be found in the current Year Book and Technical Manual of the American Association of Textile Chemists and Colorists. If not already available this book can be obtained from The Secretary, A.A.T.C.C. National Headquarters, Lowell Textile Institute, Lowell, Mass.

For many years it was customary to make laboratory washfastness tests in beakers. In attempting to standardize such tests a systematic study was made which led to the conclusion that the wide variations in the results obtained by the beaker method was due to both the lack of uniformity in the apparatus and in the manner of conducting the test. Temperatures varied considerably as did the concentration of the wash solution which due to evaporation was never constant. Removal of color due to mechanical action as occurs in actual washing procedure was almost negligible and varied with the individual operator and from time to time with the same operator.

Through consolidation of the manifold efforts of Messrs. L. C. Himebaugh, Hugh Christian, Wm. D. Appel, L. A. Olney, W. C. Smith and the Atlas Electric Devices Co., a standard laboratory washing machine, The Launder-Ometer, was developed.

As indicated by the official name plate, the Launder-Ometer is the Standard Laboratory Washing Machine of the American Association of Textile Chemists and Colorists and is manufactured and sold exclusively by the Atlas Electric Devices Co.

The Launder-Ometer is free from the faults and limitations encountered in the beaker tests and

makes possible strictly reproducible results. It has been found to give the same results as commercial and home washers in the removal of soil and for this reason is successfully used for the evaluation of soaps and detergents.

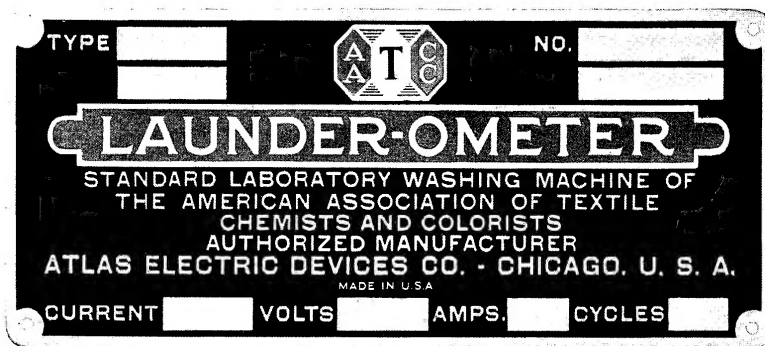
While the standard tests for washfastness utilizing the glass specimen jars provide a satisfactory and reliable means of evaluating the comparative fastness of dyed fabrics, it requires over two of these tests to produce an effect similar to one commercial laundering under today's conditions. In 1944 the A.A.T.C.C. Committee on Fastness to Washing started work on the development of a new accelerated washfastness test which would rapidly in one short test produce the color destruction and abrasive action of five average or typical commercial or home launderings. This work sponsored by the committee under the successive chairmanships of C. W. Dorn, C. A. Seibert and C. A. Sylvester was conducted jointly with the A.A.T.C.C. Research Laboratories at Lowell, Mass.

Before a standard test method could be developed and adopted it was necessary to establish the loss of color produced by multiple washings in an average or typical commercial and home laundry.

To accomplish this samples of a large variety of selected fabrics were submitted to multiple launderings in a large number of laundries over widely scattered geographical areas as well as to multiple washings in several types of home washing equipment.

In developing the accelerated washfastness tests which provide a means of approximating in one 45-minute test the color destruction and abrasive action of five average commercial or home launderings metal tubes were designed to replace the glass jars used in the standard tests.

The metal tubes, 3½" in diameter by 8" long are mounted in the Launder-Ometer horizontally at right angles to the shaft by means of an adapter which is easily installed and removed. Mounted in this fashion the test specimens are subject to a forceful throw, a long slide and a strong impact. The use of 100 stainless steel balls, as well as a lower liquor volume ratio than that employed in the standard wash tests in the glass jars, serves to increase the abrasive action. While the method of mounting the metal tubes and glass jars on the rotor is different the total number of 20 which can be accommodated at one time is the same.



The newer accelerated washfastness tests like the standard wash tests are designed to cover the ranges of severity comparable to those of general washing practice which range from the very mild wash at low temperatures to the very severe washing conditions at high temperatures with soda ash and bleach. In general the trend is to classify textiles according to the general washing procedure they will satisfactorily withstand or would normally be subjected to in actual use rather than according to the fibre. Since the accelerated tests can be used to predict five or multiples of five average commercial or home launderings they are widely used at the buyer level as a performance requirement in purchasing specifications.

RESISTANCE TO BLEEDING

The Standard Colorfastness to Washing Test Methods include the use of multifibre test cloth for evaluating the degree of bleeding or staining caused by contact of the test specimen with other materials during washing.

DRY CLEANING TESTS

The Launder-Ometer furnishes an excellent means of determining in the laboratory the colorfastness of textiles to dry cleaning. A standard method for conducting the test and evaluation of results will be found in the current Year Book and Technical Manual of the American Association of Textile Chemists and Colorists. Likewise the Launder-Ometer is widely used by both manufacturers and users in the evaluation of dry cleaning fluids and detergents.

COLORFASTNESS TO FULLING

For a long time the generally accepted opinion was that no laboratory test could be devised that would equal in practical value or simplicity the

mill practice of running such tests directly in the fulling mill. After several years of work on the part of the Research Committee of the A.A.T.C.C. a method was devised based upon the use of the Launder-Ometer which is equal to, if not better than the mill method of determining fastness to fulling of dyed material. The standard method employing $\frac{3}{4}$ " stainless steel balls and standard knit worsted tubing in the Launder-Ometer will be found in the current yearbook of the A.A.T.C.C.

DETERGENCY TESTS

The Launder-Ometer is also very effectively used in evaluating the cleansing power and deteriorative action of soaps and detergents. The soil removal from a specimen of a standard soiled fabric washed under standard reproducible conditions in the Launder-Ometer can be determined by photoelectric reflectance measurements or by weighing. Complete evaluation of a soap or detergent may require the use of several standard soiled fabrics each having different types of soil. Standard soiled fabrics of more than one type are available commercially but if these do not include all of the various types of soil in which there is interest the usual practice is for the laboratory to prepare additional standard soiled fabrics to meet their own requirements. In addition to soil removal from the standard soiled fabric the use of a piece of white or multifibre test cloth in the test permits the evaluation of the redeposition of soil by the soap or detergent.

LEATHER DYEING

The Launder-Ometer furnishes a unique and ideal piece of apparatus for making laboratory leather dyeing tests. In laboratories or tanneries, particularly where dye tests are made, the Launder-Ometer will be found of great value. Through

its use, twenty comparative and simultaneous dyeings may be made under absolutely uniform conditions of temperature and mechanical agitation and under conditions which duplicate to a considerable extent the actual process of leather dyeing. The Launder-Ometer may also be used for certain comparative tanning experiments.

TEXTILE DYEING

Controlled temperatures up to boiling under uniform conditions of agitation make the Launder-Ometer ideal for conducting laboratory dyeing tests on textiles. Since both the glass jars and metal tubes are closed containers the effect of oxidization due to contact with the air is eliminated. For dyeing tests in glass jars many prefer to substitute cellophane covered rubber stoppers for the glass tops as they permit the use of more pressure and give more assurance that the dye liquor will not escape from the jar into the constant temperature water bath.

DIMENSIONAL CHANGES

While the use of the Launder-Ometer for making laboratory shrinking tests has not received the official recommendation of the American Association of Textile Chemists and Colorists by the adoption of a standard method, a number of Launder-Ometer users find the device wholly satisfactory for their particular requirements.

GENERAL LABORATORY USE

There are many laboratory tests and experiments requiring the treatment of materials with liquids under uniform conditions of agitation and temperature. For such work the Launder-Ometer is particularly well adapted and will be found of considerable value.

MECHANICAL DETAILS

The Launder-Ometer is a self-contained electrically operated unit of all-metal construction designed to give years of dependable trouble-free service. Occupying a floor area of 28 inches by 64 inches it has a height of 52 inches to the top of the control cabinet, with a net weight of 375 pounds and a domestic shipping weight of 525 pounds. The Launder-Ometer is shipped completely assembled ready to connect to the electric power, water supply, drain and steam or gas lines according to the heating medium employed.

FRAME

The machine is built within and is rigidly supported by a welded angle iron frame finished in dark green lacquer. The four legs are equipped with gliders.

WATER BATH

A stainless steel tank or reservoir is employed to contain the constant temperature water bath through which the specimen containers are rotated during the test. This tank is rectangularly shaped at the top, rounded at the bottom and has a capacity of approximately 15 gallons when filled to the water line. This depth of water permits one row of specimen containers to be out of the water when they are stopped at the upper point of rotation at which position they are readily accessible for either opening of the containers, for the addition of solutions or for the removal of the containers from the rotor without the necessity of draining the tank. All models except the automatic gas type are supplied with the tank insulated by one-half inch of corrugated asbestos which is covered by a protective metal jacket.

The tank is equipped with threaded flanges for the drain, overflow drain, cold water inlet, hot

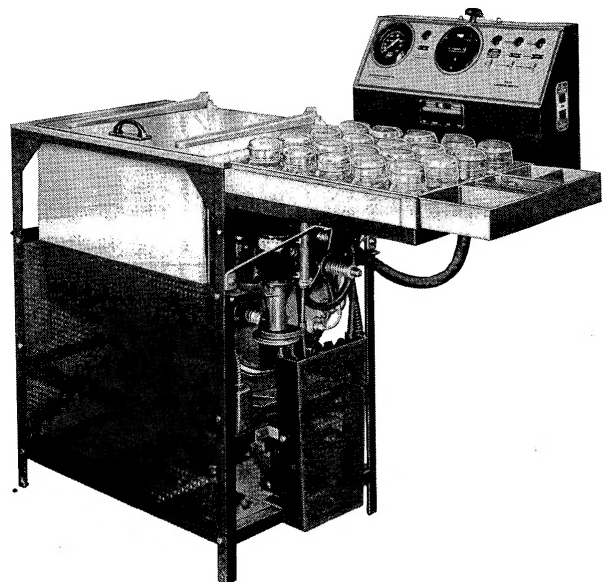
water inlet, outlet to preheating loading table pump, drain from overflow in preheating loading table, thermo-regulator element, indicating thermometer element and electric immersion heaters or steam coil depending upon the heating medium employed.

If both hot and cold water lines are available it is recommended that both be connected to the Launder-Ometer as filling the tank with hot water when first starting will materially reduce the time required to bring the water up to the desired temperature and thus effect a saving in electricity, gas or steam. The hinged cover of stainless steel is equipped with a plastic handle for ease of opening.

HEATING MEDIUM

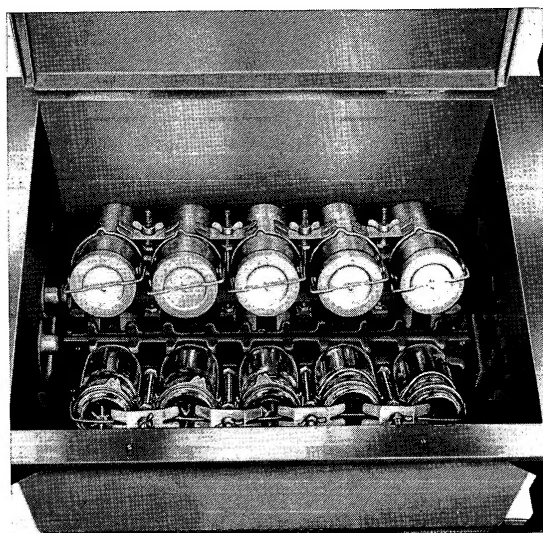
All Launder-Ometers are equipped with a direct reading dial type Thermo-regulator which through suitable relays and control equipment automatically maintains the constant temperature water bath at the temperature selected by the operator. This may vary from room temperature up to boiling point depending upon the particular test which is being utilized. Centigrade or Fahrenheit scales are optional for both the Thermo-regulator and the indicating thermometer.

Launder-Ometers are constructed to utilize elec-



Standard Launder-Ometer with Preheating Loading Table.

tricity, steam or gas for heating the water bath. Because of convenience and availability at all times electricity is the most generally used. Where greater flexibility and speed of heating is desired, the model employing both steam coils and electric immersion heaters is recommended. In this model the two sources of heat may be used independently or simultaneously as desired. Where steam is employed, low pressures are desirable, although the Launder-Ometer can be supplied for operation on pressures above 100 lbs. While steam is the most economical method of heating its availability at all times should be considered before the decision on its use is made.



Interior view showing method of mounting Glass Jars and Metal Specimen Containers

The automatic gas model can be supplied for operation with natural, bottled or manufactured gas or mixtures thereof. This model is equipped with an automatic safety valve which shuts off the gas to the burners if the pilot light flame is extinguished. Consideration of the gas heated model should take into consideration any objection that may exist to having a large open gas burner in operation in the laboratory. Type or Model designations, electrical, engineering and ordering data will be found in the back pages of the catalog.

ROTOR

The jar holding rotor is a four-sided corrosion resistant cast rotor, each side having five openings into which the pint-sized glass test jars fit. Each side is equipped with four studs, bronze spring clamps and wing nuts which securely hold the jars in a vertical position at right angles to the side of the rotor on which they are mounted. When all of the glass jars are in place, there are four rows of five jars each or a total of twenty.

DRIVING MECHANISM

The rotor is securely fastened to a polished stainless steel shaft which is rotated in self-aligning bronze bearings and is driven at a uniform rate of 42 r.p.m. by a fractional h.p. motor through a gear reducer, pulleys, V belt and friction clutch. The motor and gear reducer unit are mounted on a hinged base with the weight of the unit providing the

proper tension on the V belt. A spring type safety clutch is provided to permit stalling the rotor without injury to the operator or the machine. As an added protection to the operator a perforated metal guard is fitted over the protruding end of the drive unit.

SPECIMEN CONTAINERS

Pint sized glass specimen jars are employed in the various standard washfastness tests which are described in detail in the current Technical Manual and Year Book of the American Association of Textile Chemists and Colorists. Each jar contains

one individual specimen with the wash solution and stainless steel or rubber balls so that up to 20 specimens may be tested at one time. Most test methods require a specimen 2" x 4". The use of multifibre test cloth for bleeding tests, the wash solution and the number of stainless steel or rubber balls utilized vary according to the test method employed.

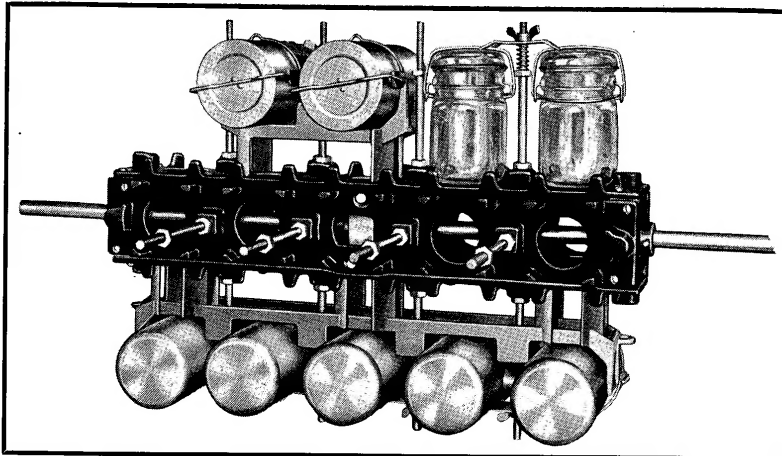
For the newer accelerated washfastness tests metal tubes instead of glass jars are employed. These tubes $3\frac{1}{2}$ " in diameter and 8" long, are held horizontally away from and at right angles to the side of the rotor on which they are mounted by adapter plates or castings. The adapter castings which are easily inserted and removed are supplied in two sizes, one holding two metal tubes and the other five metal tubes.

When the rotor is in motion the jars or tubes revolve radially with the rotor at a speed of approximately 42 r.p.m. through the constant temperature water bath. While the speed of rotation is constant the temperature of the water bath and the duration of the test will vary according to the test method employed.

If the number of samples to be tested at any one time is less than 20 so that the rotor is not completely filled on all four sides with either glass jars or metal tubes, the actual number of jars or tubes being employed should be distributed as nearly as possible on opposite sides of the rotor so that the load is evenly distributed to avoid an unbalanced condition.

The standard Launder-Ometer has a maximum capacity of 20 glass jars, 20 metal tubes or a combination of glass jars and metal tubes whose total is 20.

THE LAUNDER-OMETER



Close-up view of Rotor showing method of mounting Glass Jars and Metal Tubes with 2-Tube and 5-Tube Adapters

CONTROL CABINET

All Laundry-Ometers are fully automatic and are equipped with the control cabinet conveniently located on the right-hand side of the machine at the same working level as the top of the machine. The control panel contains all of the switches, pilot lights, thermo-regulator and dial type indicating thermometer. Directly in back of the control panel are located the relays, fuses or overload circuit breakers for the motor and heater circuits. All switches and electrical appliances are used and wired in a manner to provide complete safety to the operator.

PREHEATING LOADING TABLE

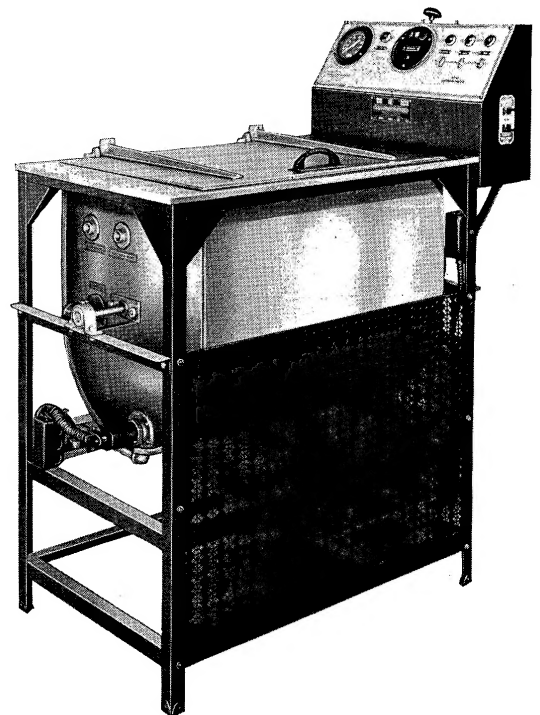
The Preheating Loading Table is standard equipment on all Laundry-Ometers but may be omitted if sufficient floor area is not available. It is an important adjunct, increasing the accuracy of the

test by permitting all specimens to be started at the same temperature. Loading one set of specimens in the Preheating Loading Table while another series is being tested results in a great saving of time and increased output of the machine.

Convenient trays are provided for holding the accessories (jar tops, rubbers, balls, etc.). The conveniently located jar holder makes the loading of the specimens, solution and spheres as well as capping of the jars rapid and positive.

At the end of the test the solution can be quickly separated from the specimens and spheres by merely pouring the contents of the jar into the built-in sink.

The jars in the Preheating Loading Table are rapidly brought up to and are automatically maintained at the temperature required in the test. This is accomplished by circulating water from the main tank or reservoir through the preheating loading table. Like the main tank the Preheating Loading Table is fabricated of stainless steel and is insulated.



Exterior View of the Laundry-Ometer Without Preheating Loading Table

RESEARCH MODEL LAUNDER-OMETERS

In Research and Development work it is often desirable to study the behavior of a new product under widely different variations of the various factors encountered in washfastness tests. In addition to variations in temperature these may include size of the specimen, size and shape of the specimen container, number and size of the stainless steel or rubber spheres, and the speed of rotation.

For this type of work we recommend the Research Model Launder-Ometers which are available in two models, the L-1-Q and L-2-Q. These two models differ only in the number of the various sized specimen containers that can be used and the method of their mounting on the jar holding rotor. Included in the variety of specimen containers that may be used in the Research Models are the one-pint glass jars utilized in the standard washfastness tests and the Metal Tubes employed in the newer accelerated washfastness tests. The Research Model Launder-Ometers are thus all-purpose units since they can be used both for the standard tests and for special research work.

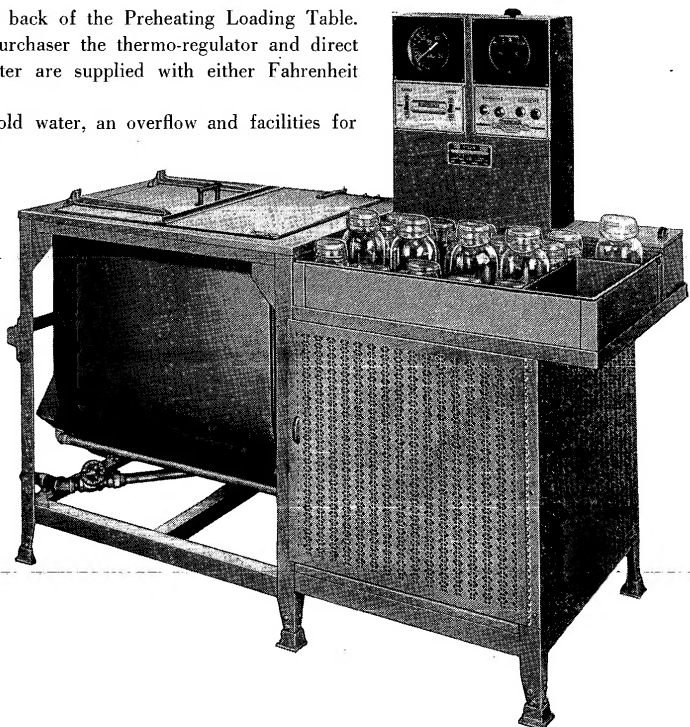
As standard equipment both the L-1-Q and L-2-Q Model Launder-Ometers are supplied with a vari-speed drive unit providing a selection of rotor or jar rotation speeds of 15 to 50 R.P.M. All Research Model Launder-Ometers are equipped with Preheating Loading Tables which increase the accuracy of the test by insuring that all specimens are started at the same temperature. Preparation of one set of specimens while another set is being run also increases the volume of samples that can be tested per working hour.

All electrical control equipment including the thermo-regulator, direct reading dial thermometer, switches, pilot light, relays, etc. are contained in the control cabinet which is conveniently lo-

cated above and at the back of the Preheating Loading Table. At the option of the purchaser the thermo-regulator and direct reading dial thermometer are supplied with either Fahrenheit or Centigrade scales.

Inlets for hot and cold water, an overflow and facilities for rapidly draining the tank or reservoir are provided. A safety switch disconnects the drive motor whenever the cover of the main bath or reservoir is raised. The water bath and preheating table are of stainless steel and are insulated with one-half inch corrugated asbestos protected by an outside metal jacket.

Research Model Launder-Ometers are generally supplied with electric immersion heaters as the heating medium. The power requirements for both the L-1-Q and L-2-Q are approximately 13 KVA. These models can be supplied for operation on either a single phase or three phase alternating current line of 208 to 245 volts on any of the standard frequencies. If the above voltages are not available a transformer will be required to bring the line voltage to the 208-245 volt operating range of the Launder-Ometer. Research Mod-



Exterior view of the Research Model Launder-Ometer

els are available for 230 volts D.C.

Research Model Launder-Ometers occupy a floor area of 34 inches by 74 inches and have a height of 62 inches to the top of the control cabinet. They have a net weight of 1100 pounds and a domestic shipping weight of 1250 pounds.

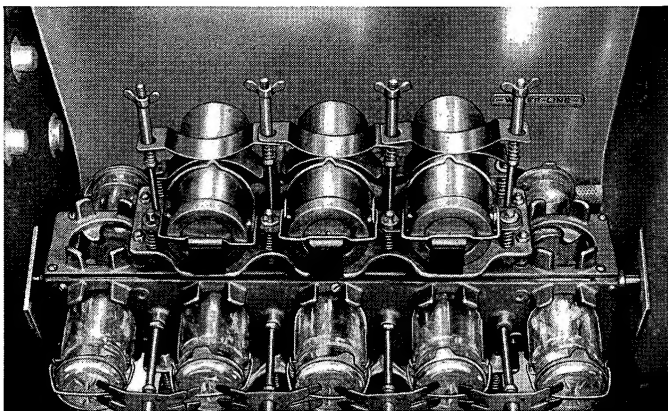
MODEL L-1-Q

The Model L-1-Q Research Launder-Ometer has a maximum rotor capacity of 20 one-pint glass jars, 20 one-quart glass jars or any combination of one-pint and one-quart glass jars whose total is 20. Five jars in a row are mounted vertically at right angles to the rotor and shaft on each of the four sides of the rotor and revolve radially with the rotor and shaft. The rotor is so designed that the one-pint glass jars are accommodated directly in the openings of the rotor castings. Easily inserted and removed adapter discs are utilized in the openings on the rotor castings when the one-quart glass jars are being used. Adapter Plates similar to those used in the Standard Launder-Ometer are employed when the metal specimen containers are used.

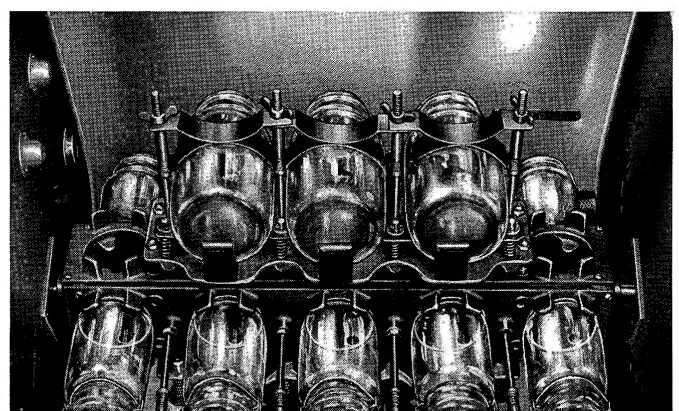
MODEL L-2-Q

The Model L-2-Q Research Model Launder-Ometer will accommodate one-pint and one-quart glass jars in the same number and manner as the Model L-1-Q. In addition to the one-pint and one-quart glass jars it will also accommodate a total of 6 two-quart glass jars. This is accomplished by the use of the two adapter units, each of which hold 3 two-quart glass jars on opposite sides of the rotor replacing two rows or 10 of the one-pint or one-quart glass jars. In these adapters the two-quart glass jars are mounted horizontally away from and at right angles to the shaft and jar holding rotor. This adapter unit will also in the same manner accommodate six of the $3\frac{1}{2}$ inch diameter by 8 inch long metal tubes required for the new Accelerated Washfastness tests.

If it is desired to utilize the $3\frac{1}{2}$ inch diameter by 8 inch long Metal Specimen Containers required for the Accelerated Washfastness Tests in the Model L-1-Q or more than six in the Model L-2-Q Research Launder-Ometers; adapter plates, each of which accommodate five metal containers, are available. These adapter plates for the Research Model Launder-Ometer, each hold five containers in a row in a similar manner to the five-jar adapter utilized in the Standard Launder-Ometer. There are of course some dimensional differences between the 5-jar adapters used in the Research and Standard Launder-Ometers but the distance from the jar to the center of the shaft is the same so that the arc of rotation is the same. Thus with 4 adapter plates a total of 20 metal containers can be utilized in either of the Research Model Launder-Ometers.



Interior View of Research Model Launder-Ometer showing method of mounting one-pint glass jars and metal specimen containers in 3-jar adapter



Interior View of Research Model Launder-Ometer showing method of mounting one-quart and two-quart glass specimen containers

Partial List of Launder-Ometer Users

COMMERCIAL LABORATORIES

Balassa Res. Labs.....New Bedford, Mass.
Better Fabrics Testing Bureau.....N.Y.C.
Derby Co.Lawrence, Mass.
Economics Laboratory.....St. Paul, Minn.
EMTEC Associates.....Stamford, Conn.
Good Housekeeping Inst.....New York, N. Y.
Pease Laboratories Inc.....New York, N. Y.
Pittsburgh Testing
LabsSan Francisco, Calif.
Textile Testing & Res. Labs.....N.Y.C.
U. S. Testing Co.....Hoboken, N. J.
York Research Co.....Stamford, Conn.

COLLEGES, SCHOOLS AND INSTITUTIONS

Alabama Polytechnic Inst....Auburn, Ala.
University of Alabama.....University, Ala.
University of Cincinnati.....Cincinnati, Ohio
Clemson College.....Clemson, S. C.
University of Chicago.....Chicago, Ill.
Central Commercial H. S.....N.Y.C.
University of Connecticut.....Storrs, Conn.
Callaway Institute, Inc.....La Grange, Ga.
University of Southern
CaliforniaLos Angeles, Calif
Columbia University.....New York, N. Y.
Bradford Durfee Textile
SchoolFall River, Mass.
Florida State College.....Tallahassee, Fla.
Georgia School of Technology.....Atlanta, Ga.
Georgia University.....Athens, Ga.
Iowa State College.....Ames, Iowa
Kansas State Agricultural
CollegeManhattan, Kansas
Lowell Textile Institute.....Lowell, Mass.
Louisiana State University
.....Baton Rouge, La.
Long Beach Board of
EducationLong Beach, Calif.
Michigan State College.....E. Lansing, Mich.
University of Minn.....Minneapolis, Minn.
University of Michigan.....Ann Arbor, Mich.
Mellon Institute of Industrial
ResearchPittsburgh, Pa.
Needle Trades H. S.....New York, N. Y.
North Carolina State
CollegeRaleigh, N. C.
New York University.....New York, N. Y.

N. Y. State Institute of Applied Arts
and Science.....New Hartford, N. Y.
New Bedford Textile
Institute.....New Bedford, Mass.
Ohio State University.....Columbus, Ohio
Oklahoma A. and M.
CollegeStillwater, Okla.
Ohio UniversityAthens, Ohio
Oregon State College.....Corvallis, Oregon
Philadelphia Textile
Institute.....Philadelphia, Pa.
Purdue UniversityLafayette, Ind.
Rhode Island School of
DesignProvidence, R. I.
Southern Regional Inst.....Birmingham, Ala.
South Dakota State
CollegeBrookings, S. D.
Institute of Textile
TechnologyCharlottesville, Va.
Washington State College.....Pullman, Wash.
Wisconsin University.....Madison, Wis.

COTTON, SILK AND RAYON MILLS

Abbeville Mills Corp.....Abbeville, S. C.
American Bemberg
Corp.Port Rayon, Tenn.
Androscoggin MillsLewiston, Maine
Avondale Mills.....Sylacauga, Ala.
Bates Mfg. Co.....Lewiston, Maine
Burlington Mills Corp.....New York, N. Y.
Cannon Mills.....Kannapolis, N. Y.
Celanese Corp.....New York, N. Y.
Clearwater Mfg. Co.....Clearwater, S. C.
Commercial Textile Mills.....Clifton, N. J.
Cone MillsGreensboro, N. C.
Crown Mfg. Co.....Pawtucket, R. I.
Dana Warp Mills.....Westbrook, Maine
Dan River Mills.....Danville, Va.
Deering, Milliken.....Stamford, Conn.
Erwin Cotton Mills Co.....Cooleme, N. C.
Exeter Mfg. Co.....Exeter, N. H.
Fildercrest MillsSpray, N. C.
Jaunty FabricsScranton, Pa.
Kilburn Mills.....New Bedford, Mass.
Merrimack Mfg. Co.....Lowell, Mass.
Millville Mfg. Co.....Millville, N. J.
Mooreville Cotton Mills.....Mooreville, N. C.
Patterson Mills Co.....Roanoke Rapids, N. C.
Pepperell Mfg. Co.....Lindale, Ga.
Riegel Textile Corp.....Trion, Ga.
Russell Mfg. Co.....Middletown, Conn.

Wm. Skinner & Sons.....New York, N. Y.
Springs Cotton Mills.....Grace, S. C.
Standard Coosa Thatcher Co.....Rossville, Ga.
A. Steinam Co.....New York, N. Y.
J. P. Stevens Co.....New York, N. Y.
Stonecutter Mills Co.....Spindale, N. C.
Textron, Inc.....Nashua, N. H.
Thomaston Mills.....Thomaston, Ga.
United Merchants & Mfg.
Co.....New York, N. Y.
Warwick MillsBoston, Mass.
West Point Mfg. Co.....Shawmut, Ala.

DYEING, FINISHING AND TEXTILE PRINTING

Acme Finishing Co.....Pawtucket, R. I.
Allied Textile Printers Inc.....Paterson, N. J.
American Finishing Co.....Memphis, Tenn.
Apponaug Co.....Apponaug, R. I.
Jos. Bancroft & Sons Co.....Rockford, Del.
R. W. Bates Piece Dye
WorksGarnerville, N. Y.
Central Yarn & Dyeing Co.....Gastonia, N. C.
Cliffsided Dyeing Corp.....Paterson, N. J.
Colgate Piece Dye Works.....Hawthorne, N. J.
Consolidated Textile Co.....N. Adams, Mass.
Cranston Print Works.....Cranston, R. I.
Eugene Cross & Co.....Marion, N. C.
Crystal Springs Bleachery
.....Chickamauga, Ga.
Davis Mills Corp.....Fall River, Mass.
Delta Finishing Co.....Kollocks, S. C.
Eclipse Piece Dye Works.....Passaic, N. J.
Eddystone Mfg. Co.....Eddystone, Pa.
Eureka Printing Co.....Clifton, N. J.
Fairforest Co.....Cleveland, S. C.
Fair Lawn Finishing Co.....Fair Lawn, N. J.
Gaede Dyeing Co.....Paterson, N. J.
Glasgo Finishing Co.....Glasgo, Conn.
Glenlyon Print Works.....Phillipsdale, R. I.
Globe Dye Works.....Philadelphia, Pa.
Graniteville Co.....Graniteville, S. C.
Helliwig Dyeing Corp.....Philadelphia, Pa.
Housatonic Dyeing & Printing
Co.....Derby, Conn.
Keerr Bleaching & Finishing
WorksConcord, N. C.
Lanett Bleachery & Dye Works.....Lanett, Ala.
Modern Central Silk Dyeing
& Finishing Co.....Paterson, N. J.

Mount Hope Fin. Co.....N. Dighton, Mass.
New Process Dyeing &
Finishing Co.....Paterson, N. J.
Nina Dye Works.....York, Pa.
Phillipsburgh Textile Print
Works.....Phillipsburgh, N. J.
Pilgrim Piece Dye Works.....Brooklyn, N. Y.
Plymouth Dye Works.....Paterson, N. J.
Rock Hill Printing &
Finishing Co.....Rock Hill, S. C.
Sanco Piece Dye Works.....Phillipsburg, N. J.
Seyer Silk Dyeing &
Finishing Co.....Haledon, N. J.
Shamokin Dye &
Print Works.....Shamokin, Pa.
Southbridge Fin. Co.....Southbridge, Mass.
J. L. Stifel & Sons.....Wheeling, W. Va.
Uncas Printing &
Finishing Co.....Mechanicsville, Conn.
United Piece Dye Works.....Lodi, N. J.
U. S. Finishing Co.....Providence, R. I.
Vat Craft Corp.....New York, N. Y.
Velveray Corp.....Clifton, N. J.
Ware Shoals Bleachery.....Ware Shoals, S. C.
Waldrich Company.....Delawanna, N. J.
R. Wolfendon & Sons.....Attleboro, Mass.

DYESTUFFS AND CHEMICALS

Allied Chemical &
Dye Corp.....Morristown, N. J.
Althouse Chemical Co.....Reading, Pa.
American Aniline
Products Co.....Chattanooga, Tenn.
American Cyanamid Corp.....Stamford, Conn.
Andreykovicz &
Dunk, Inc.....Philadelphia, Pa.
Arkansas Co., Inc.....Newark, N. J.
B. T. Babbett, Inc.....Albany, N. Y.
Blackman-Uhler Co.....Spartanburg, S. C.
Blockson Chemical Co.....Joliet, Ill.
Burkart-Schier Chemical
Co.....Chattanooga, Tenn.
Calco-Chemical Division.....Bound Brook, N. J.
Carbide & Carbon Chemical
Division.....Charleston, W. Va.
Celluldyne Corp.....New York, N. Y.
Ciba Co.....New York, N. Y.
Cincinnati Chemical
Works.....Cincinnati, Ohio

THE LAUNDER-O-METER

Commercial Solvents

Corp. Terre Haute, Ind.
 C-Z Chemical Co. Beloit, Wis.
 Diamond Alkali Co. Pittsburgh, Pa.
 Dow Chemical Co. Midland, Mich.
 Du Pont Wilmington, Del.
 Geigy Co., Inc. New York, N. Y.
 General Aniline & Film Co. Easton, Pa.
 General Chemical Co. Edgewater, N. J.
 General Dyestuff Corp. New York, N. Y.
 Haas-Miller Corp. Philadelphia, Pa.
 Hercules Powder Co. Wilmington, Del.
 Hilton Davis Co. Cincinnati, Ohio
 Arnold Hoffman Co. Providence, R. I.
 Interchemical Corp. Hawthorne, N. J.
 Charles Lenning & Co.,
 Inc. Philadelphia, Pa.
 Monsanto Chemical Co. Boston, Mass.
 National Aniline Division. New York, N. Y.
 Naugatuck Chemical Co. Naugatuck, Conn.
 Nova Chemical Corp. New York, N. Y.
 Oronite Chemical Co. San Francisco, Calif.
 Patent Chemicals, Inc. Paterson, N. J.
 Pennsylvania Salt
 Mfg. Co. Philadelphia, Pa.
 Philadelphia Quartz Co. Berkeley, Calif.
 Pioneer Chemical
 Works, Inc. Philadelphia, Pa.
 Progressive Color &
 Chemical Co. New York, N. Y.
 Quaker Chemical
 Products Corp. Conshohocken, Pa.
 Rampel Chemical Co. Mt. Vernon, N. Y.
 Richard Chemical Works. Jersey City, N. J.
 Royce Chemical Co. Carlton Hill, N. J.
 Sandoz Chemical
 Works, Inc. New York, N. Y.
 Sharples Continental Corp. Baltimore, Md.
 Southern Dyestuff Corp. Charlotte, N. C.
 Standard Chemical Products. Hoboken, N. J.
 Sun Chemical Corp. East Rutherford, N. J.
 Tennessee Eastman Corp. Kingsport, Tenn.
 United Aniline Co. Boston, Mass.
 U. S. Industrial
 Chemical, Inc. Newark, N. J.
 Victor Chemical Co. Chicago Heights, Ill.
 Wallenstein Co., Inc. Staten Island, N. Y.
 Warwick Chemical Co. West Warwick, R. I.
 Jacques Wolf & Co. Clifton, N. J.
 Wyandotte Chem. Corp. Wyandotte, Mich.

FASTENERS

Conmar Products Co. Newark, N. J.
 Talon, Inc. New York, N. Y.

G. E. Prentice Mfg. Co. New Britain, Conn.
 Waldes Koh-i-noor. Long Island, N. Y.

KNITTING MILLS

Argo Knitting Mills. Schuylkill Haven, Pa.
 P. H. Hanes
 Knitting Co. Winston-Salem, N. C.
 Holeproof Hosiery Co. Marietta, Ga.
 Interwoven
 Stocking Co. Martinsburg, W. Va.
 Jantzen Knitting Mills. Portland, Oregon
 Munsingwear, Inc. Minneapolis, Minn.
 Ware Knitters, Inc. Ware, Mass.
 Wilson Brothers South Bend, Ind.
 Wiscasset Mills Alberman, N. C.

OIL, INCLUDING EDIBLE OIL

Alco Oil & Chemical Co. Philadelphia, Pa.
 Atlantic Refining Co. Philadelphia, Pa.
 E. F. Drew & Co. Boonton, N. J.
 Humble Oil & Ref. Co. Baytown, Texas
 Masury Young Co. Boston, Mass.
 Phillips Petroleum Co. Bartlesville, Okla.
 Radbill Oil Co. Philadelphia, Pa.
 Shell Development Co. Emeryville, Calif.
 Socony-Vacuum Oil Co. New York, N. Y.
 South Texas Cotton Oil Co. Houston, Texas
 Standard Oil Dev. Co. Elizabeth, N. J.
 Standard Oil Co. of Calif. Richmond, Calif.
 Standard Oil of Ind. Whiting, Ind.
 Standard Oil of La. Baton Rouge, La.
 Union Oil Co. of Calif. Wilmington, Calif.
 Universal Oil Products Co. McCook, Ill.

RETAILERS

Abraham & Straus. Brooklyn, N. Y.
 Marshall Field & Co. Chicago, Ill.
 R. H. Macy & Co. New York, N. Y.
 Sears, Roebuck & Co. Chicago, Ill.
 Montgomery Ward & Co. New York, N. Y.
 J. C. Penney Co. New York, N. Y.
 Aldens Inc. Chicago, Ill.
 Spiegel Chicago, Ill.
 G. C. Murphy Co. McKeesport, Pa.
 Wm. Filene's Sons Co. Boston, Mass.
 Joseph H. Cohen & Sons. Philadelphia, Pa.

SOAPS AND DETERGENTS

Armour & Co. Chicago, Ill.
 Colgate-Palmolive-Peet Co.
 Jersey City, N. J.

Cowles Chemical Co. Cleveland, Ohio
 Climalene Co. Canton, Ohio
 J. Eavenson & Sons Co. Camden, N. J.
 Fels & Co. Philadelphia, Pa.
 Gold Dust Corp. Baltimore, Md.
 E. F. Houghton & Co. N. Philadelphia, Pa.
 Kamen Soap Products Co. Barberton, Ohio
 Kelite Products Co. Los Angeles, Calif.
 Lever Brothers. Cambridge, Mass.
 Manhattan Soap Sales Corp. Bristol, Pa.
 Oakite Products Inc. New York, N. Y.
 Perfex Mfg. Co. Omaha, Nebr.
 Perkins Soap Co. Springfield, Mass.
 Philadelphia Quartz Co. Philadelphia, Pa.
 Procter & Gamble Co. Ivorydale, Ohio
 Purex Corp. Southgate, Calif.
 Swift & Co. Chicago, Ill.
 Scholler Brothers Inc. Philadelphia, Pa.
 Theobald Industries Kearney, N. J.
 M. Werk St. Bernard, Ohio

THREAD & YARN

American Enka Enka, N. C.
 American Thread Co. Willimantic, Conn.
 American Viscose Co. New York, N. Y.
 Belding-Heminway
 Corticelli Putnam, Conn.
 Clark Thread Co. Albany, Ga.
 J & P Coats. Pawtucket, R. I.
 Dean & Sherk Co. Inc. Lawrenceburg, Ky.
 Florence Thread Co. Riverside, N. J.
 No. Georgia Process Co. Inc. Toccoa, Ga.
 A. H. Rice Co. Pittsfield, Mass.
 Thread Inc. Gastonia, N. C.

U.S. GOV'T.
DEPT. OF AGRICULTURE

Bureau of Home Ec. Washington, D. C.
 Southern Regional Labs. New Orleans, La.
 Bureau of Home Economics. Beltsville, Md.
 Eastern Regional Res. Lab. Wyndmoor, Pa.
 Western Regional Res. Lab. Albany, Calif.

AIR FORCE

Wright Field Dayton, Ohio

COAST GUARD

Clothing Dept. Jersey City, N. J.

MARINE CORPS

Quartermaster Depot Philadelphia, Pa.
 Base Quantico, Va.

DEPARTMENT OF COMMERCE

National Bureau of
 Standards Washington, D. C.

NAVY

Air Material Center. Philadelphia, Pa.
 Clothing Depot. Brooklyn, N. Y.
 Medical Supply Depot. Brooklyn, N. Y.
 Naval Academy Annapolis, Md.
 Navy Yard Philadelphia, Pa.

WAR DEPARTMENT

Chemical Warfare Service. Lawrence, Mass.
 Edgewood Arsenal. Edgewood, Md.
 Quartermaster Depot Chicago, Ill.
 Quartermaster Depot
 Ft. Sam Houston, Texas
 Quartermaster Depot Jeffersonville, Ind.
 Quartermaster Depot. Philadelphia, Pa.
 Veteran's Adm. Hospital. Peekskill, N. Y.

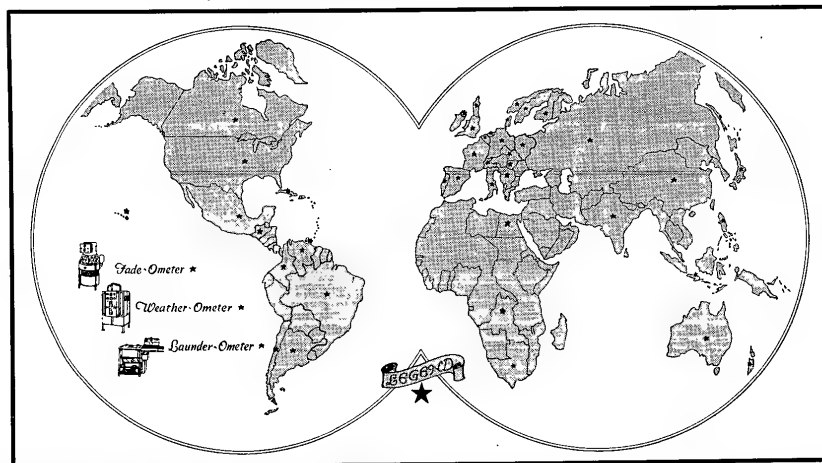
WOOLEN & WORSTED
MANUFACTURERS

American Woolen Co. Lawrence, Mass.
 Amoskeag-Lawrence Mills
 Inc. Manchester, N. H.
 Bachmann Uxbridge Uxbridge, Mass.
 Beacon Mfg. Co. Swannanoa, N. C.
 Botany Worsted Mills. Passaic, N. J.
 Dale Worsted Mills. Woonsocket, R. I.
 Excelsior Mills. Union, S. C.
 Julius Forstmann & Co. Passaic, N. J.
 Goodall Sanford Co. Sanford, Maine
 Hayward-Schuster Woolen
 Mills E. Douglas, Mass.
 A. D. Juilliard & Co. New York, N. Y.
 Kent Mfg. Co. Clifton Heights, Pa.
 James Lees & Sons. Bridgeport, Pa.
 North Star Woolen
 Mill Minneapolis, Minn.
 Pacific Mills. Lawrence, Mass.
 Peerless Woolen Mills. Rosville, Ga.
 M. T. Stevens & Sons. Rockville, Conn.
 Tilton Worsted Mills. Laconia, N. H.
 Washougal Woolen Mills
 Washougal, Wash.

The Sun Never Sets on Atlas Ometers

ARGENTINA	ITALY
AUSTRALIA	JAPAN
BELGIAN CONGO	JAVA
BELGIUM	MEXICO
BRAZIL	THE NETHERLANDS
CANADA	NEW ZEALAND
CHILE	NORTHERN IRELAND
CHINA	NORWAY
COLOMBIA	PAKISTAN
CUBA	PANAMA CANAL ZONE
CZECHOSLOVAKIA	PHILIPPINES
DENMARK	POLAND
EGYPT	PORTUGAL
ENGLAND	SCOTLAND
FINLAND	SPAIN
FRANCE	SWEDEN
GERMANY	SWITZERLAND
GREECE	TRINIDAD
GUATEMALA	URUGUAY
HAWAII	UNION OF SOUTH AFRICA
HUNGARY	U.S.S.R.
INDIA	UNITED STATES
IRELAND	VENEZUELA
ISRAEL	YUGOSLAVIA

Used in 48 Countries throughout the World, Atlas Ometers are the only universally accepted yardsticks of accelerated testing.



The world wide use of Atlas equipment is indicative of its acceptance as standard by all scientific and industrial nations for performance tests of raw materials and finished merchandise.

The time to test a product is prior to market introduction; the place is in your laboratory. Like so many self-evident truths, the significance is sometimes overlooked. Well intentioned research frequently stops short of hurdling the consumer performance test, either because direct measurements have not been possible, or is accomplished only after expensive research.

In the field of sunproofness, washability and weathering, Atlas has changed all that. Three world famous instruments have provided since 1919 the necessary standardized, reproducible conditions for evaluating quality in terms of consumer use, at moderate cost and maintenance.

Thousands of Atlas instruments are in daily use

throughout the world, checking the quality of raw materials, safeguarding production, making it possible to make and keep guarantees, stopping rejects, complaints and adjustments; truly insurance worth any reasonable premium. The value of the millions of hours Atlas Ometers have saved thousands of users all over the world during the past thirty years in providing rapid reliable answers to quality problems, is incalculable.

Atlas Ometers are versatile enough to cover every legitimate need of the industries they are designed to serve, and do their job so well they enjoy government and engineering society endorsement. A quarter century of unremitting effort, generously aided by government, industrial and scientific associations, has made these instruments the accepted method of measuring performance prior to use.

Prior to 1918 the colorfastness of fabrics and

similar materials was tested by exposing to sunlight—and if results were twice alike it was a coincidence! How could it be otherwise? The intensity of sunlight varies with latitude, season of year, time of day and clarity of the atmosphere. Obviously these variables prevented a common basis of testing, interpretation and action; tests could often not be run for days, or but intermittently, and never duplicated.

World War I brought restricted shipments of dyestuffs to America thus making a bad situation worse. It was into this chaotic situation Atlas introduced the Fade-Ometer. Then came in rapid succession the Weather-Ometer and Launder-Ometer.

You may refer all problems of sunfastness, launderability and weathering to the appropriate Atlas Ometers with complete confidence that prestige will be enhanced, net profit improved.

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

ORDERING DATA FOR THE LAUNDER-OMETER - EXPORT
ELECTRICAL INFORMATION

All Launder-Ometers are designed for potentials according to the model selected. We recommend the Full Automatic Electric standard Launder-Ometer LHD-EF, and Full Automatic Electric Special Models L-1-Q, and L-2-Q, for use on a power circuit of 208 or 230 Volts so as not to disturb the average lighting circuit. However, 115 Volt models can be supplied if required. It is advisable to consult your electrician in every case; and where the voltage is above 245, it is necessary to procure a transformer to reduce your possible 380, 440 or 550 Volts to 230 Volts. The Full Automatic Gas or Steam Models are recommended for 115 Volts, but can be supplied for 230 Volts. State exact voltage available at location of Launder-Ometer.

All Launder-Ometer Models are prepared for single phase operation. The Model L-1-Q or L-2-Q can be supplied for three phase operation if requested. The direct current Launder-Ometers are available in either 115 or 230 Volts.

Please indicate whether Launder-Ometer should be calibrated in Centigrade or Fahrenheit.

LHD-EF
FULL AUTOMATIC ELECTRIC
A.A.T.C.C. Standard

Furnished with two 2200 Watt Immersion Type Heating Elements for automatically maintaining water temperatures in reservoir with dial Thermo-Regulator. Total Power 5 K.W.

LHD-AG
FULL AUTOMATIC GAS
A.A.T.C.C. Standard

Furnished with two gas burners for automatically maintaining water temperatures in reservoir with dial Thermo-Regulator. Equipped with automatic gas shut-off should pilot be accidentally extinguished. The Type of Gas supply must be stated. (BTU/Cu.Ft.) Total Power 0.5 K.W.

LHD-AS
FULL AUTOMATIC STEAM
A.A.T.C.C. Standard

Furnished with steam coils for automatically maintaining water temperatures in reservoir with dial type Thermo-Regulator. The Steam Pressure must be stated. Total Power 0.5 K.W.

L-1-Q
FULL AUTOMATIC ELECTRIC
A.A.T.C.C. Standard
and Research

Furnished in Vari-Speed only. This model will accommodate either or both 1 Pint (0.47 Litre) and 1 Quart (0.95 Litre) Test Jars; furnished with six 2200 Watt Immersion Type-Heating Elements. Total Power 13.0 K.W.

L-2-Q
FULL AUTOMATIC ELECTRIC
A.A.T.C.C. Standard
and Research

Furnished in Vari-Speed only. This model will accommodate combinations of the 1 Pint (0.47 Litre), 1 Quart (0.95 Litres) and 2 Quart (1.90 Litres) Test Jars, thus increasing the scope of your particular studies. Furnished with six 2200 Watt Immersion Type-Heating Elements. Total Power 13.0 K.W.

Regular line and Booster Transformers can be easily included in the shipment of the Launder-Ometer without extra boxing, therefore our Domestic Prices prevail. See separate price sheet on transformers.

SOLE MANUFACTURERS

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0
ATLAS ELECTRIC DEVICES CO.

4114 N. Ravenswood Ave., Chicago 13, Illinois

Approved For Release 2001/11/24 : CIA-RDP80-00926A007800250001-0

LAUNDER-OMETER SHIPPING DATA - EXPORT

Prices of all Launder-Ometers are quoted F.A.S. Atlantic and Gulf Ports of Exit only. If U.S. Pacific ports are selected, add 2% to the published prices.

The following items of expense must be added to our published prices: Ocean freight, marine insurance, all risks; storage, if any; and Consular Fees, if any. These will be contracted for by the shipper and charged to the purchaser at prevailing rates at date of sailing.

It is understood and agreed that the vendor shall not be liable for delay in or non-performance of any obligation hereunder, including delivery of any goods or merchandise, if such delay or non-performance occurs by reason of any condition beyond vendor's control, and for which he is not responsible, including strikes, fire, flood, Acts of God, riot, or action of any governmental authority, domestic or foreign.

We furnish below the approximate weights and measurements of shipments of the various Launder-Ometer models, to enable the purchaser to ascertain the approximate costs in addition to the published F.A.S. prices:

LAUNDER-OMETER MODEL	SUPPLIES FOR	GROSS WEIGHT		NET WEIGHT		MEASUREMENTS	
		Pounds	Kilos	Pounds	Kilos	Cu. Ft.	Cu. M.
LHD-EF (Electric)	1 Year	685	311	475	215	70	1.98
LHD-EF (Electric)	2 Years	785	356	525	238	70	1.98
LHD-AG (Gas)	1 Year	685	311	475	215	70	1.98
LHD-AG (Gas)	2 Years	785	356	525	238	70	1.98
LHD-AS (Steam)	1 Year	685	311	475	215	70	1.98
LHD-AS (Steam)	2 Years	785	356	525	238	70	1.98
L-1-Q (1 Quart, or	1 Year	1215	551	695	315	117	3.32
L-1-Q 0.95 Litre)	2 Years	1455	660	1055	479	122	3.40
L-2-Q (2 Quart, or	1 Year	1295	655	775	338	117	3.32
L-2-Q 1.90 Litre)	2 Years	1790	813	1150	522	131	3.67

Shipment of the Launder-Ometer includes substantial packing so as to insure its safe arrival at destination. Accordingly, extreme care is taken in the selection of boxing material, the necessary markings required, and compliance with existing regulations governing export shipments. We suggest that you clearly indicate the method in which boxes are to be marked for our mutual protection.

ATLAS ELECTRIC DEVICES CO.

Approved For Release 2001/11/24 : CIA-RDP80-00926A007800250001-0

~~Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0~~
EXPORT LAUNDER-OMETER PRICE LIST - U.S. ATLANTIC AND GULF PORTS OF EXIT ONLY

(Additional Charges applicable when U.S. Pacific Ports are selected) All prices in U.S.Dollars.

A COMPLETE LAUNDER-OMETER includes a fully assembled machine, with Preheating Loading Table (see illustrations on Pages 8 and 9 of catalog). When received, it is ready to operate when connected to a source of electric current. Sufficient supplies are shipped with the machine for either one year, or two years, continuous operation.

ALL FULL AUTOMATIC MODELS	ALTERNATING CURRENT				DIRECT CURRENT	
	115 V.* or 208 V. or 220-245 Volts				115* or 230 V.	
	60 Cycles		50 or 25 Cycles			
	1 Year	2 Years	1 Year	2 Years	1 Year	2 Years
LHD-EF (Electric)	\$ 973.00	\$1078.00	\$ 995.00	\$1100.00	\$1003.00	\$1107.00
LHD-AG (Gas)	970.00	1075.00	990.00	1095.00	1000.00	1104.00
LHD-AS (Steam)	968.00	1073.00	988.00	1092.00	997.00	1101.00
L-1-Q, Vari-Speed	2194.50	2307.00	2194.50	2307.00	2260.00	2372.00
L-2-Q, Vari-Speed	2358.50	2483.00	2358.50	2483.00	2457.00	2587.00

* Not recommended except in Gas and Steam models, as power demand may exceed normal available current. Model LHD-EF draws 45 Amperes, and both L-1-Q, and L-2-Q draw 120 Amperes on 115 Volts.

SUPPLIES SHIPPED WITH EACH LAUNDER-OMETER	LHD-EF, LHD-AG, LHD-AS		L-1-Q		L-2-Q	
	All Single Speed		Vari-Speed			
	1 Year	2 Years	1 Year	2 Years	1 Year	2 Years
1 Pint (0.47 Litre) Jars	72	144	72	144	72	144
1 Quart (0.95 Litre) Jars	0	0	48	96	48	96
2 Quart (1.90 Litre) Jars	0	0	0	0	24	48
1/4" (6.4mm) Stainless Steel Balls	1500	3000	1500	3000	1500	3000
Record Cards, Form 617-L	300	600	300	600	300	600
Immersion Heaters (Not on LHD-AG, AS)	2	2	4	4	6	6
Dollar Value, Miscellaneous Items (Approx.)	15	30	60	66	68	84

To accomplish the 2A, 3A, and 4A Tentative Accelerated Washfastness Test, outlined in the A.A.T.C.C. YEAR BOOK, the following recommended number and size of adapter plates, with prices based F.O.B. Chicago (unless included with a Launder-Ometer shipment) may be added if desired:

Number of Metal Containers	Number and Size of Adapter Castings	PRICES ON Metal Containers & Adapters	Each
1-2 require	One 2-Jar Adapter	2-Jar Adapter Plate for LHD	\$ 5.00
3-4 require	Two 2-Jar Adapters	5-Jar Adapter Plate for LHD	10.00
5-10 require	Two 5-Jar Adapters	5-Jar Adapter for LIQ or L2Q	15.00
11-20 require	Four 5-Jar Adapters	Metal Containers, all models	9.85

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0
TRANSFORMERS FOR ATLAS OMETERS

Transformers are required when your alternating current line voltages are other than within the range of 208 to 250 volts. We quote below separately the required capacity for each separate Ometer, and also on larger transformers to accommodate more than one Atlas Ometer, or other laboratory equipment. By combining the current capacities when more than one Ometer (plus other electrically operated laboratory machines) is operated from the power line, the most suitable transformer can be determined. As indicated on three phase operation it is sometimes more economical to utilize 2 single phase transformers instead of one 3-phase transformer.

POWER TRANSFORMERS

BOOSTER TRANSFORMERS

MODELS	<u>1-Phase</u>		<u>3-Phase Power Line</u>			<u>1-Phase</u>		<u>3-Phase Power Line</u>	
	No.	Rating	No.	Rating	Phases	No.	Code	No.	Code
<u>Fade-Ometer:</u>									
FDA-R	1	3-KVA	1	3-KVA	Single	1	#61	1	#61
<u>Weather-Ometer:</u>									
BWM-CC	1	3-KVA	1	3-KVA	Single	1	#61	1	#61
SMC, SMC-H	1	5-KVA	1	5-KVA	Single	1	#61	1	#61
SMC-R, SMC-HR	1	7½-KVA	2	5-KVA	Single	1	#63	2	#61
DMC, DMC-H	1	7½-KVA	2	5-KVA	Single	1	#63	2	#61
DMC-R, DMC-HR	1	15-KVA	1	15-KVA	Three	1	#64	3	#61
XW	1	7½-KVA	1	7½-KVA	Single	1	#63	1	#63
XW-R	1	15-KVA	2	7½-KVA	Single	1	#64	2	#63
<u>Launder-Ometers:</u>									
LHD-EF, LHD-AS/EF	1	5-KVA	2	3-KVA	Single	1*	#59	1*	#59
LHD-LIQ, LHD-L2Q	1	15-KVA	1	15-KVA	Three	1*	#59	1*	#59

*Wired in control circuit only

POWER TRANSFORMERS	<u>SINGLE PHASE</u>						<u>THREE PHASE</u>			
	<u>60 Cycle</u>			<u>50 Cycle</u>			<u>60 Cycle</u>		<u>50 Cycle</u>	
PRIMARY VOLTS	115	460	575	115	460	575	460	575	460	575
WITH 230 V.										
SECONDARY										
3 KVA	\$ 58.00	\$100.00	\$104.00	\$ 62.00	\$108.00	\$113.00				
5 KVA	82.00	145.00	152.00	89.00	158.00	165.00				
7½ KVA	110.00	200.00	210.00	119.00	219.00	230.00				
15 KVA	189.00	348.00	364.00	206.00	382.00	400.00	\$440.00	\$474.00	\$476.00	\$511.00

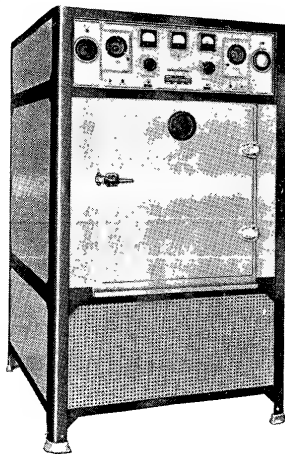
° AUTO TRANSFORMER—Contact local power company for approval.

BOOSTER TRANSFORMERS (for line voltages of 187 to 207 Volts)

Single Phase	Code #59	Code #61	Code #63	Code #64
60 Cycle	\$24.00	\$43.00	\$64.00	\$77.00
50 Cycle	25.00	46.00	68.00	84.00

THE ATLAS OMETER TRIO

STANDARD LABORATORY INSTRUMENTS OF THE WORLD FOR DETERMINING DURABILITY AND PERFORMANCE



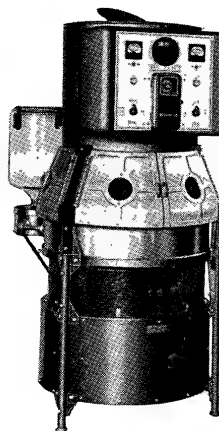
WEATHER-OMETER®

The Weather-Ometer is a laboratory apparatus for ascertaining at a greatly accelerated speed the trend of reactions which will occur on all types of products in outdoor exposures.

It is a self-contained machine, employing the three principal weathering agents, Synthetic Sunlight, Moisture and Temperature Changes.

Automatic control, regulation and application of these weathering agents make it possible to establish standard test conditions which can be duplicated and reproduced at any time or place.

The need for such equipment is evident since in addition to the extensive time required to obtain results from exposures to actual weather, the resultant tests will vary greatly not only from location to location but from day to day, month to month, and year to year at the same location.

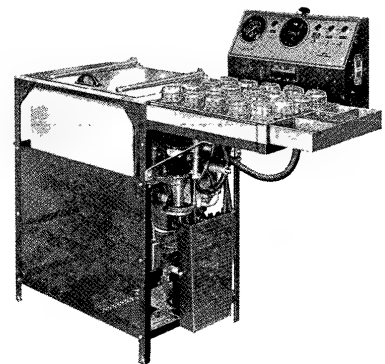


FADE-OMETER®

The Fade-Ometer is a patented self-contained electrically operated device for determining by accelerated tests in the laboratory the action of sunlight on all materials.

The need for such equipment is evident in every industry having products which fade or otherwise deteriorate from the action of the sun. Natural sunlight, available only part of a 24 hour day at best, and frequently not at all, is never constant due to the difference in latitude, season of year, time of day and local climatic conditions.

The Enclosed Violet Carbon Arc, source of radiant energy, provides noon June sunlight 24 hours per day. The Fade-Ometer provides constant, uniform and reproducible conditions regardless of time or place, thus speeding up research and production and insuring quality of product.



LAUNDER-OMETER®

The Launder-Ometer is the standard laboratory washing machine of the American Association of Textile Chemists and Colorists and is used throughout the world for quickly determining the colorfastness of textiles to commercial laundering and domestic washing.

From one to twenty samples may be tested simultaneously under controlled conditions of temperature and mechanical action.

Available with either one-pint glass jars for the standard tests or with metal containers for the accelerated washfastness tests.

All Launder-Ometers have full automatic control with a choice of electricity, gas or steam for heating the water bath. The Preheating and Loading Table is an indispensable accessory for added efficiency and reduction of operator time.

Write for complete catalogs describing each machine.

Sole Manufacturers

ATLAS ELECTRIC DEVICES COMPANY

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

4114 N. Ravenswood Ave., CHICAGO 13, ILL.

Accelerator®

Wet and Dry Abrasion Tests

Scorch Tester

Chlorine Retention Testing

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0



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UNCLASSIFIED

For determining the light-fastness of color

ATLAS

Fade-Ometer



ATLAS ELECTRIC DEVICES CO. • CHICAGO 10, ILLINOIS, U. S. A.

NEW ADDRESS

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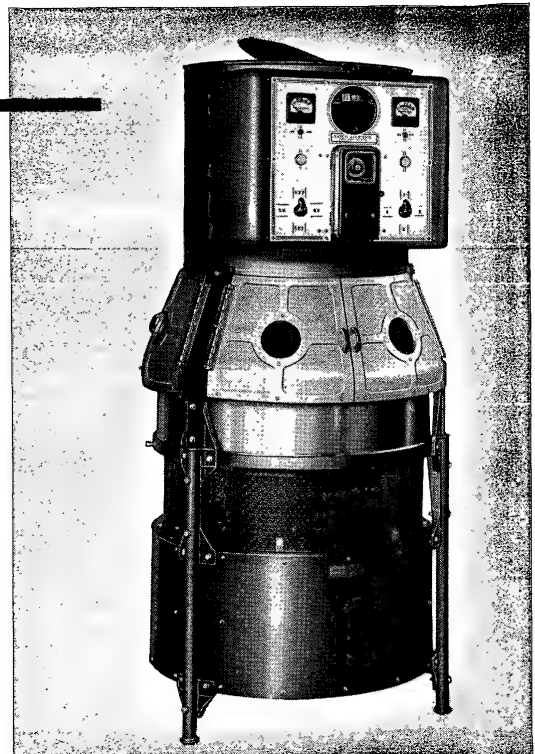
Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

The Fade-Ometer

The International Yardstick for Measuring the Effect of Sunlight

Pioneered by Atlas in 1919 to assist America's infant dye industry, The Fade-Ometer has become the universally accepted medium for predetermining in the laboratory the light fastness of colors and other photochemical changes caused by exposure to sunlight.

Specified for Government purchases, approved by engineering and technical societies, depended upon by industry as an important research tool, the Fade-Ometer is relied upon the world over for product improvement, quality control, lower production costs and greater net profit.



Atlas Electric Devices Company

361 W. SUPERIOR ST. • CHICAGO 10, ILL., U. S. A.

New Address

4114 N. Ravenswood Ave., Chicago 13, Ill., U. S. A.

Printed in U. S. A.

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ALL PRINCIPAL NATIONS

The Fade-Ometer —

What It Is and What It Does

The Fade-Ometer is a patented self-contained electrically operated device for determining by accelerated tests in the laboratory the action of sunlight on all materials.

The need for such equipment is evident in every industry having products which fade or otherwise deteriorate from the action of the sun. Natural sunlight, available only part of a 24 hour day at best, and frequently not at all, is never constant due to differences in latitude, season of year, time of day and local climatic conditions. The Fade-Ometer provides constant, uniform and reproducible conditions regardless of time or place, thus speeding up research and production and insuring quality of output.

INSURES BETTER PRODUCTS

The dependable advance knowledge of color-fastness obtained from the Fade-Ometer has pointed the way to many noteworthy improvements in a wide range of products.

While a particular pigment or dye may be of good fast-to-light quality for some applications, a variation in its use may give radically changed results. A short test in the Fade-Ometer will quickly give an indication of its adaptability to new applications and if found satisfactory permit guarantees of the color fastness of a new product.

DIMINISHES REJECTIONS

The Fade-Ometer by providing reliable color fastness information in a short period of time

serves not only as a research tool in the development of new and untried processes and products but also as a means of checking the uniformity and quality of material from the production line.

In production control alone it will pay for itself many times over as the rapid detection of poor fastness-to-light qualities in a particular run will enable early correction of the condition and will possibly prevent thousands of dollars worth of sub-standard products from being marketed. The costly process of rejection and return with the corresponding loss of good will, prestige and confidence can thus be largely eliminated.

SALES PROMOTION

Any testing program which determines the quality of products before production is started and again checks the finished product before shipment is fundamentally sound. The use of proper quality control prevents spoilage, raises production standards, and lowers costs. Such honest effort is rewarded with greater sales and increased prestige.

In the field it serves, each Atlas Ometer has made great contributions to greater net profit. Many of our customers have found their competitive position so improved that public announcements have been made, and whole advertising programs built around their use of Atlas equipment.



Excellent Light-Fastness

PRINCIPLE OF ACCELERATED FADING

If radiation approximating Noon June Sunlight both quantitatively and qualitatively is played on specimens under controlled conditions of temperature and humidity it is to be expected that color, chemical and physical changes will develop similar to those produced by exposures in actual sunlight.

In the Fade-Ometer the acceleration of results is accomplished by providing continuously 24 hours a day a test condition in which the various factors producing the changes in the specimen are maintained at their maximum values encountered in actual sunlight exposures.

ATLAS ELECTRIC DEVICES COMPANY

ATLAS FADE-OMETER



Poor Light-Fastness

TEMPERATURE

Ambient temperature at the face of the specimens is controlled automatically to within $\pm 3^\circ$ F. by a dial type thermo-regulator within the range of 95° to 150° F. A dial type thermometer unit is supplied as standard equipment with each machine which provides an easy convenient method of measuring ambient temperature in accordance with standard methods specified by the A.A.T.C.C., A.S.T.M. and Federal Specifications.

The ventilating system uses filtered air and the ambient temperature is kept within the predetermined limits by means of an electrically operated blower actuated by the thermo-regulator. Close

control of temperature is very important and its effect on most materials cannot be ignored.

HUMIDITY

A cylindrical stainless steel reservoir filled with water at a constant level forms the base of the testing chamber. Moisture is added to the filtered air from the blower by evaporation of water from wicks which are stretched on stainless steel frames and which are partially submerged in the water. With this method relative humidities up to 50% can be obtained depending upon atmospheric conditions and the number and condition of the wicks used.

For those having a convenient source of water the Fade-Ometer is usually supplied with the Atlas Float and Valve. If it is not practical to pipe a source of water to the machine, a five gallon bottle can be supplied. In either case the water is automatically maintained at a constant level in the reservoir.

COST OF OPERATION

The Fade-Ometer is economical to operate both from the standpoint of material used and operator time. The arc consumes one inexpensive $\frac{1}{2}'' \times 12''$ carbon electrode in each 24 hours of operation. Since the machine will operate continuously for 24 hours a minimum amount of operator attention is necessary, only a few minutes a day for inserting new carbons, cleaning the globe and inspecting and changing specimens. The machine can be set for automatic shut down for any period up to 24 hours thus increasing the usable machine hours.

With the arc operating at its normal 15 to 17 amperes and 120 to 145 arc volts the Fade-Ometer consumes approximately 2.5 kilowatts. The water consumption is about 5 gallons per 24 hour period.

The special Pyrex globe or filter unless acci-

dentally damaged has a useful life of 2000 hours. The wicks depending upon the hardness of the water used require periodic washing and occasional replacement as does the air filter depending upon the amount of dirt in the air. All other parts and accessories have a life expectancy of years and do not normally require replacement.

SAFETY

The Fade-Ometer is designed to comply with the various Safety Standards for ordinary use conditions and may be safely operated through the night without attention. With ordinary care it may be safely operated without danger of personal injury to the operator or other laboratory personnel.

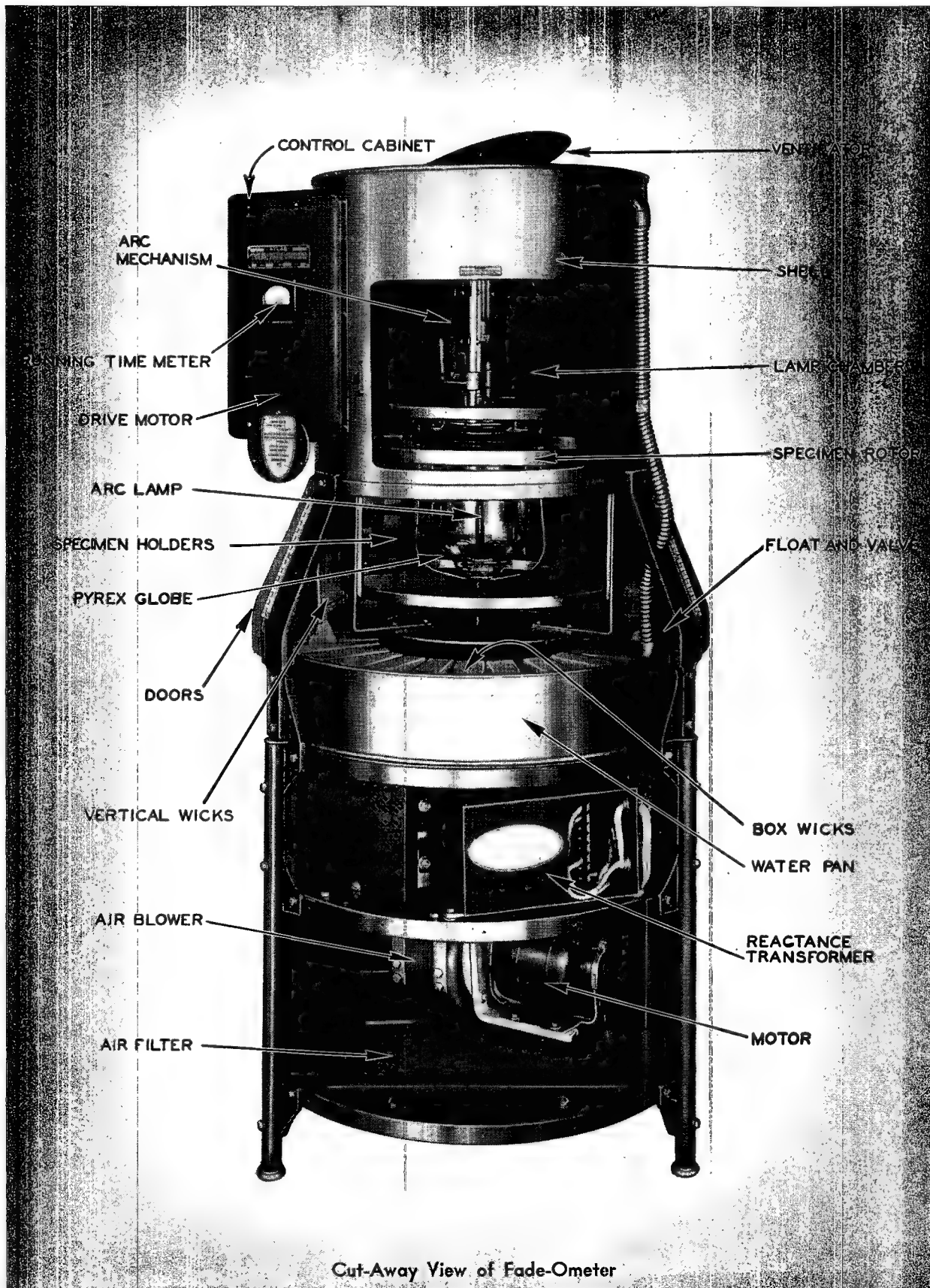
SHIPPED COMPLETE

The Fade-Ometer is shipped complete ready to connect to outlets of electric power and water. Included with it are all of the necessary supplies, accessories and operating instructions. There are no extras to buy before the machine can be put in daily operation.

ELECTRICAL CHARACTERISTICS

The Fade-Ometer can be supplied for operation on Direct Current or Alternating Currents of 25, 40, 50 and 60 Cycles. On Alternating Current the Fade-Ometer can be operated directly from any two wires, or one phase, of any power circuit having a voltage of 208 to 250 volts regardless of whether it is a single phase, 2-phase or 3-phase system. For any other line voltage, such as 110-115, 185-207, 380, 440, 550, transformers can be furnished which will bring the available line voltage to the 208-250 Volt operating range of the Fade-Ometer. On Direct Current the Fade-Ometer will operate satisfactorily only on voltages between 220 and 250 as transformers cannot be utilized.

Atlas Fade-Ometer



Description of Instrument

GENERAL CONSTRUCTION

The Fade-Ometer is of all metal construction built to give years of dependable service. It is totally enclosed, the upper part of the machine forming the test chamber the bottom of which consists of the stainless steel water reservoir and the lower portion or base of the machine containing the blower unit, air filter, reactance transformer and other equipment.

Six doors are provided around the circumference of the machine for easy access to all specimens and to the interior of the machine as well as an extra door for use when servicing the arc mechanism. The top is provided with a hinged balanced louvre for ventilation which opens and closes as the blower is actuated. The base is equipped with hinged doors for easy inspection, changing of the air filter and service of the blower motor.

Legs elevate the base of the Fade-Ometer approximately five inches from the floor providing for easy cleaning.

The Fade-Ometer requires a floor space of 43" by 33" and measures approximately 68" in height.

CONTROL CABINET

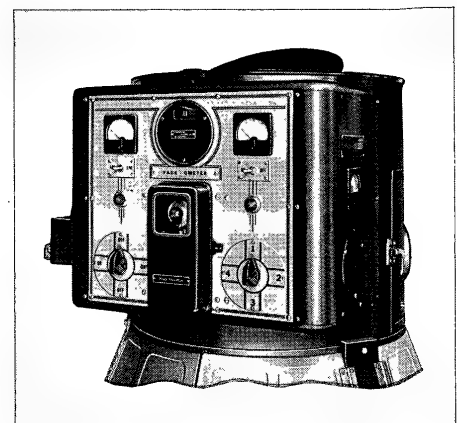
The speed, degree and character of fading, chemical and physical changes are a function of time, temperature, humidity and radiation. All of these variables must be subject to control within the limits set by nature if comparable results are to be obtained. The success of the Atlas Fade-

Ometer is based upon the uniformity and unremitting constance of these physical conditions, rather than to the use of artificial circumstances which permit no correlation with actual use.

The Control Cabinet located at convenient eye level has been designed with these objectives in mind. A Voltmeter and Ammeter with special scales are provided as a check on both the arc and line voltages and the current consumed by the arc. A four-point switch makes it possible to regulate minor variations of arc intensity due to small fluctuations of line voltage.

The Time Switch provides an automatic means of shutting off the Fade-Ometer at any predetermined time within 24 hours, a great convenience to the operator.

The Running Time Meter located on the side of the control cabinet removes the personal element of maintaining an accurate detailed log of the actual hours of exposure received by the specimens. Recording the meter reading at the start of the exposure of any specimen or group and likewise noting the reading when removed enables the operator to accurately determine the exact number of hours of exposure they have received. This is especially useful where specimens are started at different times and are exposed for varying numbers of hours. The Running Time Meter is of the nonresetting type which makes it impossible for anyone to change the actual record of the exposure hours.



Control Cabinet Type FDA-R

A Main-Line Switch, Inspection Light Switch, Thermo-Regulator, Pilot Lights and Voltmeter Switch complete the control cabinet.

TEST CHAMBER

Standard specimen holders and tests masks, for a variety of materials, are supplied as part of the equipment. The specimens, mounted in their holders, are suspended in the test chamber on a circular rack which engages both the top and bottom of the holders insuring the proper vertical alignment at all times. These are rotated around the light source at a constant speed at a fixed distance of ten inches which insures equal radiation for all specimens.

The Fade-Ometer is operated with a full set of holders which are filled with any available material if a complete set is not required. In this manner maximum uniformity of test condition is attained.

Specimen Holders

The number of specimens tested simultaneously may be varied from 9 to 126 depending upon the size chosen.

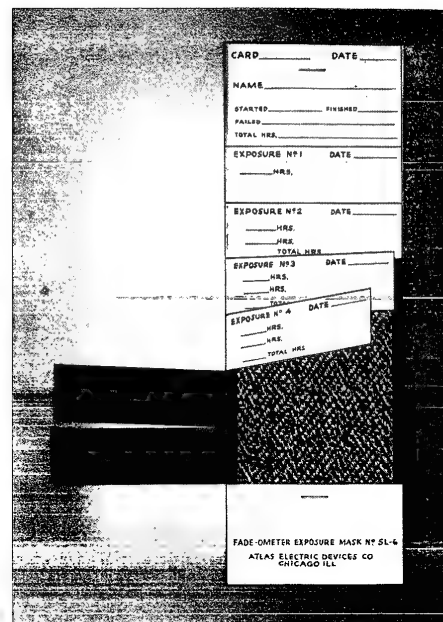
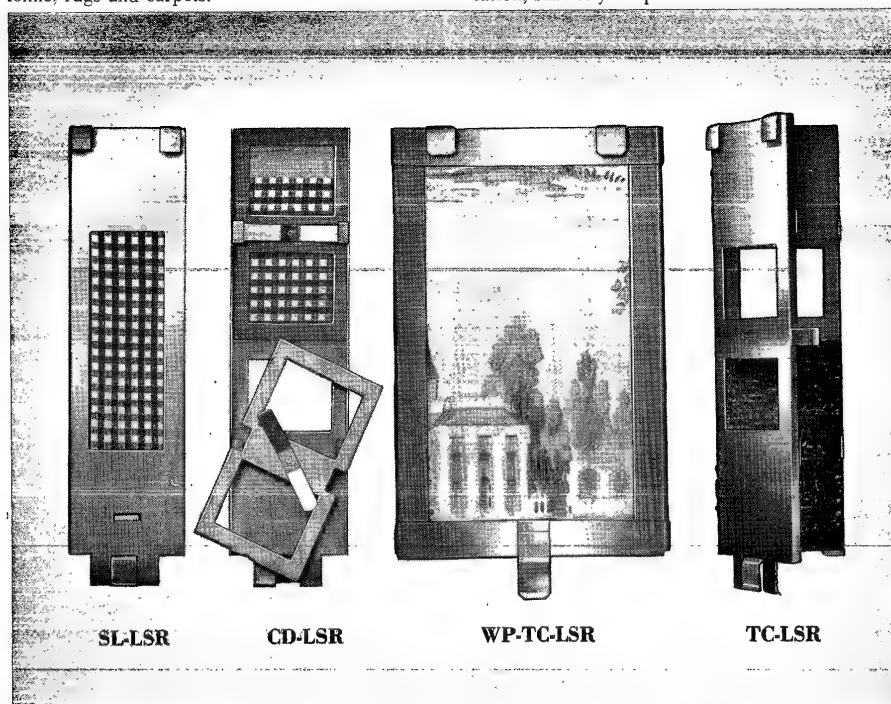
The Type CD-LSR and SL-LSR Specimen Holders illustrated below are the ones most commonly used since they provide ample exposure area and will conveniently accommodate flat specimens such as textiles, paper, plastic films, protective and decorative coatings on metal panels, etc.

The Type TC-LSR is used for thick materials such as rugs or carpets and the WP-TC-LSR for large figured patterns such as wallpaper, cretonne, rugs and carpets.

Type of Holder	No. of Specimens	Size of Specimens	Exposure Area
CD-LSR	2	2 3/4" x 4 3/4"	1 3/8" x 2"
TC-LSR	2	2 3/4" x 4 3/4"	1 3/8" x 2"
SL-LSR	1	2 3/4" x 8"	1 3/4" x 5"
WP-TC-LSR	1	6 1/2" x 9 3/4"	5" x 8"

For those who wish to work with liquids, as in the light-bleaching of oils, development of rancidity, photo-catalytic decomposition of organic fluids, etc., bottles and test tube holders are available.

Many other types of special holders are available. If you have some special or unusual application, submit your problem to us.



Paper Mask for Specimen Holder "SL-LSR"

EXPOSURE MASKS

When testing a color of unknown fastness on a material that is not temperature sensitive it is often convenient to have progressive steps or stages on one specimen. This can be accomplished by the use of the exposure mask which has conveniently printed and perforated flaps which permit the operator to uncover portions of the specimen in successive steps or stages.

Exposure masks and convenient filing folders are supplied for use in the SL-LSR, CD-LSR and WP-TC-LSR Specimen Holders.

The Atlas Enclosed Violet Carbon Arc

The heart of the Fade-Ometer is the Atlas Violet Carbon Arc. This is an enclosed type arc which produces a complete spectrum from $279m\mu$ through $20,000m\mu$.

This spectral distribution is accomplished by the use of the proper carbon electrodes operated under controlled current conditions in a filter globe of special optical Pyrex.

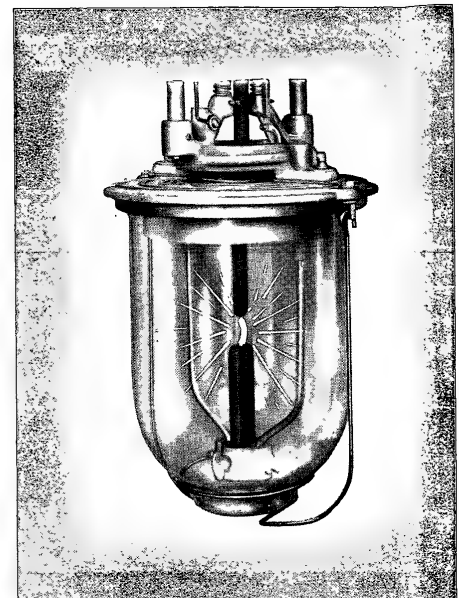
The filter globe performs three major functions. First, it filters out the shortest of the ultraviolet rays so that the resulting spectrum is extremely close to that found in summer sunlight. Secondly it prevents any possible contamination of the test specimens from products of combustion of the arc and thirdly by enclosing the arc the carbon life is greatly extended, so that a full twenty-four hour operation is possible with the consumption of a single twelve inch carbon electrode. As the Pyrex glass is slow to solarize the globe has a useful life of 2,000 hours without any appreciable change in its transmission qualities.

So well was the original engineering on the arc done that only minor changes have been made

SPECTRAL DISTRIBUTION OF ATLAS ENCLOSED ARC

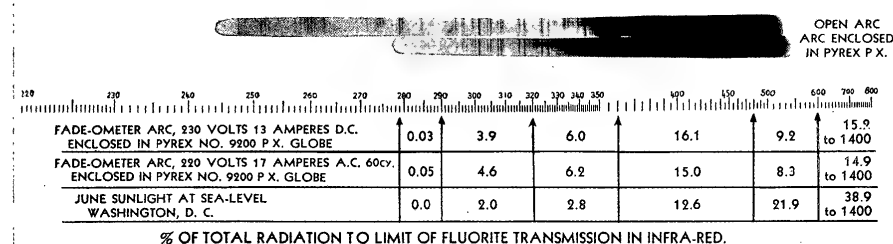
Spectral Range	Percent of Total Radiation to Limit of Fluorite Transmission in Infra-red ($12,000m\mu$)	
	Pyrex #9200-PX	Sunlight
279 $m\mu$ to 290 $m\mu$	0.05	0.0
290 $m\mu$ to 320 $m\mu$	4.6	2.0
320 $m\mu$ to 360 $m\mu$	6.2	2.8
360 $m\mu$ to 480 $m\mu$	15.0	12.6
480 $m\mu$ to 600 $m\mu$	8.3	21.9
600 $m\mu$ to 1400 $m\mu$	14.9	38.9
1400 $m\mu$ to 4200 $m\mu$	21.3	21.4
4200 $m\mu$ to 12000 $m\mu$	29.65	0.4

since its inception in 1919, and it remains today the most inexpensive, yet most dependable, artificial duplicate of sunlight known. With thousands using identical equipment comparable tests may be run anywhere and at any time. Truly, the Fade-Ometer is the common denominator of sunfast tests.



The Atlas Violet Carbon Arc

— SPECTROGRAMS —



Chemical action may often be brought about by the absorption of the infra-red, visible and ultra-violet wavelengths. The literature cites innumerable instances of light acting as a catalyst in promoting a reaction not otherwise taking place in the dark, in altering the rate of reaction already taking place, or in bringing about a new reaction which is entirely independent of the one which proceeds normally in the dark.

While the Fade-Ometer was designed primarily to utilize these principles in measuring the degree of fading of dyestuffs and the deteriorating influence of light in the artificial aging of rubber, etc., its use as a research tool such as in the qualitative analysis of materials by fluorescence should not be overlooked.

Applications and Correlation With Sunlight

APPLICATIONS

The universal appeal of colors, and the necessity for accurately advertising the permanency of the dyes employed, make the Fade-Ometer indispensable in research, production and sale promotion.

Among the world-wide industrial users who have depended upon the Fade-Ometer for over a quarter century, are:

- Dyestuff Manufacturers
- Dry Color Producers
- Dyers and Finishers
- Textile Mills
- Clothing Manufacturers
- Ink Makers
- Printers and Lithographers
- Billboard Advertisers
- Wall Paper Mills
- Government Bureaus and Departments
- Purchasing Departments
- Rug, Carpet and Upholstery Mfrs.
- Merchants (Wholesale and Retail)
- Rubber Manufacturers
- Soap and Cosmetic Manufacturers
- Plastics (Materials and Processors)
- Pharmaceutical Manufacturers
- Consultants and Testing Laboratories
- College Laboratories
- Advertising Departments
- Petroleum Laboratories
- Leather Manufacturers

CORRELATION

Correlation of fading tests either in Fade-Ometers or actual sunlight is now possible through the new calibration method which permits the expression of all test results in terms of Standard Fading Hours.

The Standard Fading hour and Calibration Method was developed by the National Bureau of Standards in cooperation with the A.A.T.C.C., A.S.T.M. and other technical societies as a simple, reliable and convenient method of measuring and expressing the fading produced in terms of a fixed arbitrary unit of measurement.

In the Calibration Method special light sensitive paper is exposed simultaneously under the same conditions as the specimens either in the Fade-Ometer or in actual sunlight. After exposure the faded paper is then compared and graded with an index of standards and the specimens are credited with having received the appropriate number of Standard Fading Hours.

Universal reporting of all test results in terms of Standard Fading Hours which are constant and unchanging instead of the variable terms of Sunlight or Fade-Ometer Hours will thus enable close correlation of tests both in the same machine from time to time, between different machines and actual sunlight exposures. The importance of this will be better appreciated when consideration is given to the fact that actual sunlight varies widely both in intensity and spectral distribution due to geographic location, time of day, season and atmospheric conditions and Fade-Ometer hours may vary according to the model and local conditions under which the particular machine is operated.

After the fading rate of a Fade-Ometer under its own particular operating condition has been determined by the calibration method the number of actual exposure hours required to produce a given number of Standard Fading Hours can be calculated and the exposure time adjusted accordingly and conversely any number of actual exposure hours can be expressed as Standard Fading Hours.

While data is not yet available this calibration method also presents a long range means of establishing in terms of a standard unit of measure the averages of actual sunlight intensities for specific locations as well as averages for large geographical areas. It also can be utilized for determining the amount of radiation that can be expected based on the end use of a specific product which will be of help in the preparation of industry and governmental minimum performance standards.

Interpolation of data assembled over a period of years in which the values for both sunlight and the Fade-Ometer represent general averages indicates the following:

DYED TEXTILES

1 Hour FDA-R Fade-Ometer equivalent to 1.7 Hours of Summer Sunlight between the hours of 9 A.M. to 3 P.M. at Washington, D. C.

LITHOGRAPHIC AND PRINTING INKS

1 Hour FDA-R Fade-Ometer equivalent to 3.3 Hours of Summer Sunlight between the hours of 9 A.M. to 3 P.M. at Washington, D. C.

Universal Acceptance of the Fade-Ometer

The extent to which industry, technical societies and governmental agencies sanction and specify the use of a testing device is the best measure of its approval as a standard. The Atlas Fade-Ometer has the unique distinction of being the only universally accepted equipment for determining color fastness to light.

A few of the many hundreds of these specifications are enumerated below. Where published standards are not available for a particular product it is recommended that the unknown be compared with a specimen of known performance, or that available specifications for products of a comparable end use be employed as a guide.

COMMERCIAL STANDARDS

Many industries have by voluntary agreement through the U. S. Dept. of Commerce adopted commercial standards specifying minimum requirements of quality, labeling and terms utilized in merchandising. A few of these in which the minimum requirements for light fastness are based on Fade-Ometer tests are enumerated below.

CS16-29 Wall Paper

CS52-35 Mohair Pile Fabrics

CS59-44 Textiles, Testing and Reporting.

INDUSTRIAL STANDARDS

In addition to those industries who have adopted commercial standards there are many, such as those listed below, who have adopted standard methods of testing but who because of their particular problems prefer to leave minimum requirements to mutual agreement between the purchaser and seller.

Textiles—D506-45T, Tentative Method for Fastness of Colored Textiles to Light, A.S.T.M. Standards.

Textiles—Colorfastness of Textiles to Light, A.A.T.C.C. Technical Manual and Year Book.

Floor Coverings—D418-42, Standard Method of Testing Pile Floor Covering, A.S.T.M. Standards.

Adhesives—D904-46T Tentative Recommended Practice for determining the effect of Artificial and Natural Light on the permanence of Adhesives, A.S.T.M. Standards.

Printed Packaging Materials—Proposed Method of Testing Printing Packaging Materials for Fastness to Light by use of the Fade-Ometer, Packaging Institute Test Procedures.

GOVERNMENT SPECIFICATIONS

Purchases by Federal, State and Local Governments have been under rigid specifications for many years. The following is a partial list of Federal Specifications in which a Fade-Ometer test is required.

<i>Federal Specifications</i>	<i>Materials</i>
C-H-131	Hats; felt and wool, men's
V-B-871a	Buttons
JJ-S-846	Sweaters; wool, knitted
KK-L-136b	Leather; artificial (upholstery)
RR-B-446	Blinds, venetian, metal slat
TT-I-521	Ink, copying and record
TT-I-531	Ink, drawing, waterproof, colored
TT-I-545	Ink; marking, quick-drying, for photographic film
TT-I-549a	Ink; red, writing
TT-I-554	Ink, stamp-pad, red for photographic prints
TT-I-556a	Ink, stamp-pad
TT-I-557	Ink, stencil, duplicating-machine, climate-proof, black, castor-oil-base
TT-I-561	Ink, stencil, duplicating-machine, climate-proof, black, non-castor-oil-base
TT-I-562	Ink, writing, for ball-point fountain pen
TT-I-563b	Ink, writing, blue-black, for fountain, dip, and steel pens
TT-I-566	Ink, writing, blue alkaline (non-corrosive)
UU-C-96c	Cards; guide, pressboard (file size)
ZZ-F-461a	Floor-covering; rubber, sheet
BBB-S-786	Suits, working; one-piece
CCC-B-686a	Broadcloth; cotton, mercerized
CCC-B-792a	Bunting; cotton, mercerized
CCC-B-801	Bunting; wool
CCC-C-521b	Cloth, window shade
CCC-D-181	Denim; shrunk
CCC-D-186	Denim; unshrunk
CCC-D-761	Duck, cotton, plied-filling-yarns and single-yarns (flat-duck)
CCC-D-771b	Duck; cotton, plied-yarns (Army, numbered and tent-duck)
CCC-G-391	Gingham
CCC-P-191a	Percalé
CCC-P-651	Prints; cotton
CCC-S-91a	Sateen, Cotton
CCC-T-191b	Textiles test methods
DDD-B-416	Blankets; combat, canvas
DDD-B-421a	Blankets; cotton, and cotton-warp and wool-filling
DDD-C-51a	Carpets and rugs; Axminster
DDD-C-61b	Carpets and rugs; velvet, plain and twisted pile
DDD-C-71a	Carpets and rugs; Wilton
DDD-F-416	Flags; United States
DDD-H-74	Handkerchiefs; cotton, bandanna
DDD-H-136	Hats; straw, men's
DDD-P-76	Pajama-coats and trousers; hospital
DDD-R-271a	Ribbons, Computing and Recording machine
DDD-R-591	Robes, bath
DDD-R-751	Rugs; American-Oriental (washed)
DDD-S-251a	Shades, window; rollers, slats, cords and accessories
DDD-S-301	Shirts; broadcloth, cotton, mercerized
DDD-T-101	Taper; linen-finish, red
LLL-B-441a	Blinds; venetian, wood-slat

Partial List of Fade-Ometer Users

AUTOMOTIVE INDUSTRY

Briggs Mfg. Co.....Detroit, Mich.
 Chrysler Corp.....Detroit, Mich.
 Fisher Body Detroit Division.....Detroit, Mich.
 Ford Motor Company.....Dearborn, Mich.
 Hudson Motor Car Co.....Detroit, Mich.
 Kaiser Frazer Corp.....Willow Run, Mich.
 Nash-Kelvinator Corp.....Detroit, Mich.
 Nat'l. Automotive Fibres Inc.....Detroit, Mich.
 Seaman Body Company.....Milwaukee, Wis.
 Vogt Mfg. Company.....Rochester, N. Y.
 Woodall Industries Inc.....Detroit, Mich.

BEDDING

Simmons Company.....Kenosha, Wis.
 Bacon Mfg. Co.....Swannanoa, N. C.
 North Star Woolen Mills.....Lima, Ohio
 Washougal Woolen Mills.....Washougal, Wash.

BUILDING MATERIALS

Celotex Corp.....Chicago, Ill.
 The Flintkote Co.....New York, N. Y.
 Wood Conversion Co.....St. Paul, Minn.

CLOTHING MANUFACTURERS

Cluett, Peabody & Co. Inc.....Troy, N. Y.
 Fashion Frocks Inc.....Cincinnati, Ohio
 Hart, Schaffner & Marx.....Chicago, Ill.
 Merit Clothing Co.....Mayfield, Ky.
 Phillips Jones Corp.....New York, N. Y.
 United Merchants & Manufacturers.....New York, N. Y.
 M. Wile & Co.....Buffalo, N. Y.
 Wilson Brothers.....South Bend, Ind.

COLLEGES AND UNIVERSITIES

Carnegie Inst. of Tech.....Pittsburgh, Pa.
 Cornell University.....Ithaca, N. Y.
 Florida State University.....Tallahassee, Fla.
 Iowa State University.....Iowa City, Iowa
 Lowell Textile Inst.....Lowell, Mass.
 Mich. State College.....E. Lansing, Mich.
 New York University.....New York, N. Y.
 Penn. State College.....State College, Pa.
 Philadelphia Textile Inst.....Phila., Pa.
 So. Dakota State College.....Brookings, S. D.
 Texas Tech. College.....Lubbock, Texas
 University of Alabama.....University, Ala.
 University of California.....Berkeley, Calif.
 University of Illinois.....Urbana, Ill.
 University of Minnesota.....Minneapolis, Minn.
 University of Missouri.....Columbia, Mo.

University of North Car.....Greensboro, N. C.
 University of Wisconsin.....Madison, Wis.

CONSULTING LABORATORIES

Better Fabrics Testing Bureau.....New York, N. Y.
 The Derby Company.....Lawrence, Mass.
 Industrial By-Products & Research Corp.....Philadelphia, Pa.
 Kaufman-Lattimer Co.....Columbus, Ohio
 Arthur D. Little Inc.....Cambridge, Mass.
 Skinner & Sherman Inc.....Boston, Mass.
 Foster D. Snell.....New York, N. Y.
 A. M. Tenney Associates.....New York, N. Y.
 Textile Testing & Research Labs.....New York, N. Y.
 U. S. Testing Company.....Hoboken, N. J.

COTTON GOODS

Acme Backing Corp.....Brooklyn, N. Y.
 Bates Mfg. Co.....Lewiston, Maine
 Beaunit Mills, Inc.....New York, N. Y.
 Burlington Mills Corp.....New York, N. Y.
 Callaway Mills.....La Grange, Ga.
 Cannon Mills.....New York, N. Y.
 Cantor Greenspan Co.....New York, N. Y.
 Chatham Mfg. Co.....Elkin, N. C.
 Clearwater Mfg. Co.....Clearwater, N. C.
 Dan River Mills Corp.....Danville, Va.
 Deering Milliken & Co.....New York, N. Y.
 Erwin Cotton Mills Co.....Coleman, N. C.
 Guyan Mills.....Valley Falls, R. I.
 Landers Corp.....Toledo, Ohio
 Millville Mfg. Co.....Millville, N. J.
 Mooresville Cotton Mills.....Mooresville, N. C.
 Pacific Mills.....Lyman, S. C.
 Pepperell Mfg. Co.....Boston, Mass.
 Riegel Textile Corp.....Ware Shoals, S. C.
 Russell Mfg. Co.....Alexandria City, Pa.
 Springs Cotton Mills.....Lancaster, S. C.
 J. P. Stevens & Co.....New York, N. Y.
 Verney Corp.....W. Peterborough, N. H.

DYEING, FINISHING, TEXTILE PRINTING

American Finishing Co.....Memphis, Tenn.
 Consolidated Textile Co.....N. Adams, Mass.
 Crystal Springs Bleachery.....Chicamauga, Ga.
 Dobeckmen Co.....Cleveland, Ohio
 Eddystone Mfg. Co.....Eddystone, Pa.
 Fairforest Finishing Co.....Fairlawn, N. J.
 Gaede Dyeing Co.....Paterson, N. J.
 Gregg Dyeing Division.....Grainville, S. C.
 Lincoln Bleachery & Dye Works.....Lonsdale, R. I.

Milprint Inc.....Milwaukee, Wis.
 Nina Dye Works.....York, Pa.
 Pilgrim Piece Dye Works.....Brooklyn, N. Y.
 Plymouth Dye Works.....Paterson, N. J.
 P.V.M. Corp.....Wappingers Falls, N. Y.
 Richmond Piece Dye Works.....Richmond, Va.
 Rock Hill Printing & Fin. Co.....Rock Hill, S. C.
 Seyer Silk Dyeing & Fin. Co.....Haledon, N. J.
 Slatersville Finishing Co.....Slatersville, R. I.
 Southern Bleaching & Print Works.....Taylors, S. C.
 Union Bleachery.....Greenville, S. C.
 United Piece Dye Works.....Lodi, N. J.
 Ware Shoals Bleachery.....Ware Shoals, S. C.

DYESTUFFS AND CHEMICALS

American Aniline Products Co.....New York, N. Y.
 Andreykovic & Dunk Inc.....Phila., Pa.
 Ansbacher-Siegle Corp.....Rosebank, N. Y.
 Aridye Corp.....Fairlawn, N. J.
 Calco Chemical Div.....Bound Brook, N. J.
 Ciba Co. Inc.....New York, N. Y.
 Dow Chemical Co.....Midland, Mich.
 E. I. Du Pont De Nemours & Co.....Wilmington, Del.
 J. S. & W. R. Eakins.....Brooklyn, N. Y.
 Geigy Co. Inc.....New York, N. Y.
 General Aniline & Film Corp.....New York, N. Y.
 General Dyestuff Corp.....New York, N. Y.
 Gordon Lacey Chemical Prod. Co.....Maspeth, N. Y.
 Harshaw Chemical Co.....Cleveland, Ohio
 Hercules Powder Co.....Wilmington, Del.
 Lennig Division.....Philadelphia, Pa.
 Marwin Dyestuff Corp.....Jersey City, N. J.
 McCarty Aniline & Extract Co.....Philadelphia, Pa.
 Monsanto Chemical Co.....St. Louis, Mo.
 National Aniline Div.....New York, N. Y.
 Nova Chemical Corp.....New York, N. Y.
 Pharma Chemical Corp.....New York, N. Y.
 Publicker Industries Inc.....Phila., Pa.
 Reichhold Chemical Co.....Detroit, Mich.
 Sandoz Chemicals Works.....New York, N. Y.
 Southern Dyestuffs.....Sodyeco, N. C.
 Standard Dyestuff Corp.....Paterson, N. J.
 Standard Ultramarine Co.....Huntington, W. Va.
 Sun Chemical.....S. San Francisco, Calif.
 United Aniline Co.....Boston, Mass.
 Jacques Wolf & Co.....Passaic, N. J.
 Zinsser & Co.....Hastings-on-Hudson, N. Y.

ELECTRICAL MANUFACTURERS

Bell Telephone Labs.....New York, N. Y.
 General Electric Co.....Schenectady, N. Y.
 Philco Corp.....Philadelphia, Pa.
 R.C.A. Laboratories.....Princeton, N. J.
 Western Electric Co.....Chicago, Ill.
 Westinghouse Elect. & Mfg. Co.....E. Pittsburgh, Pa.

FUR DYERS

Fouke Fur Co.....St. Louis, Mo.
 A. Hollander & Son.....Newark, N. J.

HATS

Frank H. Lee Co.....Danbury, Conn.
 C. & K. Purchasing Corp.....S. Norwalk, Conn.
 John B. Stetson.....Philadelphia, Pa.

INK MANUFACTURERS

Bensing Bros. & Deeney.....Philadelphia, Pa.
 Capitol Printing Ink Co.....Washington, D. C.
 Certified Printing Ink Co.....Chicago, Ill.
 A. E. Handschy Co.....Chicago, Ill.
 In-Tag Co.....Lodi, N. J.
 International Printing Ink.....New York, N. Y.
 Kohl & Madden Printing Corp.....Chicago, Ill.
 Fred'k H. Levey Co.....Chicago, Ill.
 Pope & Gray Inc.....New York, N. Y.
 Sinclair & Valentine Co.....New York, N. Y.
 Superior Type Co.....Chicago, Ill.

KNITTING MILLS

Botany Mills Inc.....Passaic, N. J.
 Jantzen Knitting Mills.....Portland, Oregon
 Julius Kayser & Co.....New York, N. Y.
 Munsingwear, Inc.....Minneapolis, Minn.
 Wilson Brothers.....South Bend, Ind.

LEATHER AND ARTIFICIAL

LEATHER

Athol Mfg. Co.....Athol, Mass.
 Blanchard Bros. & Lane.....Newark, N. J.
 E. I. Du Pont De Nemours.....Newburg, N. Y.
 Federal Leather Co.....Belleville, N. J.
 International Shoe.....Hartford, Ill.
 Masland Dural Leather Co.....Philadelphia, Pa.
 Pantasote Co.....Passaic, N. J.
 Fred Rueping Leather.....Fond Du Lac, Wis.

LITHOGRAPHERS AND

PRINTERS

American Bank Note Co.....Bronx, N. Y.

ATLAS FADE-OMETER

Brown & Bigelow.....St. Paul, Minn.
Consolidated Litho. Co.....Brooklyn, N. Y.
Progress Litho. Co.....Cincinnati, Ohio
Stafford Printers.....Stafford Springs, Conn.
U. S. Printing & Litho.
Co.....E. Norwood, Ohio

MANUFACTURERS

Adhesive Products Corp.....Bronx, N. Y.
Armstrong Cork.....Lancaster, Pa.
Hettrick Mfg. Co.....Toledo, Ohio
Hunter Douglas Corp.....Riverside, Calif.
National Cash Register Co.....Dayton, Ohio
Owens Corning Fiberglas.....Ashten, R. I.
Russell Mfg. Co.....Middletown, Conn.
Scovill Mfg. Co.....Waterbury, Conn.
W. A. Shaefer Pen Co.....Ft. Madison, Wis.
Singer Mfg. Co.....South Bend, Ind.

METALS, CONTAINERS, SIGNS

Johnson Tin Foil & Metal
Co.....St. Louis, Mo.
Metal & Thermit Corp.....Rahway, N. J.
Permanente Metals Corp. Permanente, Cal.
Standard Rolling Mills Inc., Brooklyn, N. Y.

OILS

E. F. Drew & Co. Inc.....Boonton, N. J.
Nox Rust Corp.....Chicago, Ill.
Sherwood Refining Co.....Gretna, La.
Sinclair Refining Co.....East Chicago, Ind.
Shell Development.....Emeryville, Calif.
Standard Oil Development.....Elizabeth, N. J.

PAINT, VARNISH, DRY COLOR

Glidden Co.....Cleveland, Ohio
Harmon Color Works.....Paterson, N. J.
Holland Color & Chemical.....Holland, Mich.
Hoover Color Corp.....Irvington, N. J.
Keystone Color Works Inc.....York, Pa.
National Lead Co.....Brooklyn, N. Y.
Stanley Chemical Co.....East Berlin, Conn.
Vita-Var Corp.....Newark, N. J.

PAPER MILLS

Appleton Coated Paper Co.....Appleton, Wis.
Ben Mont Paper Inc.....Bennington, Vt.
Crystal Tissue Co.....Middletown, Ohio
Hammermill Paper Co.....Erie, Pa.
International Paper Co.....Bostrop, La.
International Paper
Co.....Niagara Falls, N. Y.
The Marvellum Co.....Holyoke, Mass.
The Munising Co.....Munising, Mich.
Ohio Box Board Co.....Rittman, Ohio
St. Regis Paper Co.....Toledo, Ohio
S. D. Warren Co.....Cumberland Mill, Maine
Wortendyke Mfg. Co.....Richmond, Va.

PENCILS AND PENS

Eagle Pencil Co.....New York, N. Y.
Eversharp Inc.....New York, N. Y.
Parker Pen Co.....Janesville, Wis.
W. A. Shaefer Pen Co.....Ft. Madison, Iowa

PHARMACEUTICALS

Upjohn Co.....Kalamazoo, Mich.

PHOTOGRAPH EQUIPMENT

Agfa Anseo.....Binghamton, N. Y.
Eastman Kodak Co.....Rochester, N. Y.
John C. Marshall Inc.....Brooklyn, N. Y.

PLASTICS AND CELLULOSE PRODUCTS

Bolta Co.....Lawrence, Mass.
Hercules Powder Co.....Parlin, N. J.
Mayon Plastics.....Minneapolis, Minn.
Monsanto Chemical
Co.....Indian Orchard, Mass.
National Plastic Products.....Odenton, Md.
Pantasote Co.....Passaic, N. J.
Plastic Film Corp.....Plainfield, Conn.
Plexon Inc.....Greenville, S. C.
Resiloid Corp.....Brooklyn, N. Y.
Ross & Roberts Inc.....West Haven, Conn.
Tennessee Eastman
Corp.....Kingsport, Tenn.
Velveray Corp.....New York, N. Y.
Visking Corp.....Chicago, Ill.

RETAILERS

Hart Schaffner & Marx.....Chicago, Ill.
Marshall Field & Co.....Chicago, Ill.
R. H. Macy & Co.....New York, N. Y.
Montgomery Ward & Co.....New York, N. Y.
G. C. Murphy Co.....McKeesport, Penn.
J. C. Penney Co.....New York, N. Y.
Sears, Roebuck & Co.....Chicago, Ill.

RUBBER

American Tile & Rubber.....Trenton, N. J.
Clark Firestone Tire & Rubber Co.....Akron, Ohio
B. F. Goodrich Co.....Akron, Ohio
Goodyear Tire & Rubber Co.....Akron, Ohio
Johnson Rubber Co.....Middlefield, Ohio
I. B. Kleinert Rubber
Co.....New York, N. Y.
Middletown Rubber.....Middletown, Conn.
Parker, Stearn & Co.....Brooklyn, N. Y.
Rubber Corp. of America.....Brooklyn, N. Y.
Tillotson Rubber.....Needham Heights, Mass.
Union Baystate Co.....Cambridge, Mass.
United States Rubber Co.....New York, N. Y.

RUG AND CARPET MAKERS

Bigelow-Sanford Carpet
Co.....New York, N. Y.
A. & M. Karagheusian Inc.....Freehold, N. J.
Charles Lachman Co.....Phoenixville, Pa.
C. H. Masland & Sons.....Carlisle, Pa.
Mohawk Carpet Mills.....Amsterdam, N. Y.
Alexander Smith & Sons
Carpet Co.....Yonkers, N. Y.

SILK AND RAYON INDUSTRY

Abbeville Mills Corp.....Abbeville, N. C.
American Viscose Corp.....Philadelphia, Pa.
Bates Mfg. Co.....Lewiston, Me.
Burlington Mills Corp.....New York, N. Y.
Celanese Corp. of
America.....New York, N. Y.
Charmette Fabrics Corp.....New York, N. Y.
Gayley Mill Corp.....Marietta, S. C.
Jaunty Fabrics Corp.....Scranton, Pa.
A. D. Juilliard & Co.....New York, N. Y.
Reliance Mfg. Co.....Chicago, Ill.
Robbins Mills Inc.....Clarksville, Va.
Wm. Skinner & Sons.....Holyoke, Mass.
Tennessee Eastman Corp. Kingsport, Tenn.
Textron Inc.....New York, N. Y.

SHADE CLOTH

Joseph Bancroft & Sons.....Rockford, Del.
Cloday Corp.....Cincinnati, Ohio
Columbus Coated Fabrics.....Columbus, Ohio
Joanna Western Mills Co.....Chicago, Ill.

SOAP AND TOILETRIES

Colgate-Palmolive-Peet Co.....Jersey City, N.J.
The Andrew Jergens Co.....Cincinnati, Ohio
Lever Brothers.....Cambridge, Mass.
Proctor & Gamble Co.....Ivorydale, Ohio
Scholler Brothers Inc.....Philadelphia, Pa.

THREAD

American Thread Co.....Willimantic, Conn.
Clark Thread Co.....Newark, N. J.
A. H. Rice Co.....Pittsfield, Mass.
Saran Yarns.....Odenton, Md.
Thread Inc.....Gastonia, N. C.

UPHOLSTERY

Baxter, Kelley & Faust.....Philadelphia, Pa.
Collins Aikman.....Philadelphia, Pa.
Goodall Sanford Inc.....Sanford, Me.
F. Schumacher & Co.....Lowell, Mass.
F. Schumacher & Co.....New York, N. Y.
Woonsocket Falls Mill.....Woonsocket, R. I.

U. S. GOVERNMENT

Air Corps.....Wright Field, Ohio

Army Quartermaster
Depot.....Philadelphia, Pa.
Bureau of Engraving &
Printing.....Washington, Pa.
Bureau of Home
Economics.....Beltsville, Md.
National Bureau of
Standards.....Washington, D. C.
Coast Guard Supply
Depot.....Jersey City, N. J.
Engineer Board.....Fort Belvoir, Va.
Marine Corps Depot.....Philadelphia, Pa.
Naval Clothing Depot.....Brooklyn, N. Y.
Signal Corps.....Long Island City, N. Y.
Southern Regional Res.
Lab.....New Orleans, La.
U.S. Govt. Print. Office.....Washington, D. C.

WALL PAPER
MANUFACTURERS

Aristocrat Wallpaper Co.....Decatur, Ill.
Berge Co.....Buffalo, N. Y.
Imperial Paper &
Color.....Glens Falls, N. Y.
Inland Wallpaper Mills.....Chicago, Ill.
Keystone Color Works Inc.....York, Pa.
Mayflower Wallpaper Co.....Joliet, Ill.
The Mid-West Wallpaper
Mills, Inc.....Joliet, Ill.
Schuylerville Wallpaper
Co.....Schuylerville, N. Y.
Star-Peerless Wall Paper
Mills.....Evanston, Ill.
United Wallpaper Co.....Chicago, Ill.

WOOLENS AND WORSTEDS

American Woolen Co.....New York, N. Y.
Arlington Mills.....Lawrence, Mass.
William Barnett & Sons.....Albany, N. Y.
Botany Mills Inc.....Passaic, N. J.
Broad Brook Co.....Broad Brook, Conn.
Dexter Woolen Corp.....New York, N. Y.
Guild Northland Mills.....Laconia, N. H.
Julius Forstmann & Co.....Passaic, N. J.
Hayward-Schuster Woolen
Mills.....E. Douglas, Mass.
Kent Mfg. Co.....Clifton Height, Pa.
Lippitt Worsted Mills.....Woonsocket, R. I.
James Lees & Sons Co.....Bridgeport, Conn.
Matson Mill Inc.....S. Gladstonbury, Conn.
New Jersey Worsted Mills.....Dundee, N. J.
North Star Woolen Co.....Lima, Ohio
Pacific Mills.....Lawrence, Mass.
Paragon Worsted Co.....Providence, R. I.
Peerless Woolen Mills.....Rossville, Ga.
Pendleton Mfg. Co.....La France, S. C.
Portland Woolen Mills.....Portland, Oregon
Rock River Woolen Mills.....Janesville, Wis.

The Sun Never Sets on Atlas Ometers

ARGENTINA	ITALY
AUSTRALIA	ISRAEL
BELGIAN CONGO	JAPAN
BELGIUM	JAVA
BRAZIL	MEXICO
CANADA	THE NETHERLANDS
CANAL ZONE	NEW ZEALAND
CHILE	NORTHERN IRELAND
CHINA	NORWAY
COLOMBIA	PAKISTAN
CUBA	PHILIPPINES
CZECHOSLOVAKIA	POLAND
DENMARK	PORTUGAL
EGYPT	SCOTLAND
ENGLAND	SPAIN
FINLAND	SWEDEN
FRANCE	SWITZERLAND
GERMANY	TRINIDAD
GREECE	UNION OF SOUTH AFRICA
GUATEMALA	U. S. S. R.
HAWAII	UNITED STATES
HUNGARY	VENEZUELA
INDIA	YUGOSLAVIA

The world wide use of Atlas equipment is indicative of its acceptance as standard by all scientific and industrial nations for performance tests of raw materials and finished merchandise.

The time to test a product is prior to market introduction; the place is in your laboratory. Like so many self-evident truths, the significance is sometimes overlooked. Well intentioned research frequently stops short of hurdling the consumer performance test, either because direct measurement have not been possible, or is accomplished only after expensive research.

In the field of sunproofness, washability and weathering, Atlas has changed all that. Three world famous instruments have provided since 1919 the necessary standardized, reproducible conditions for evaluating quality in terms of consumer use, at moderate cost and maintenance.

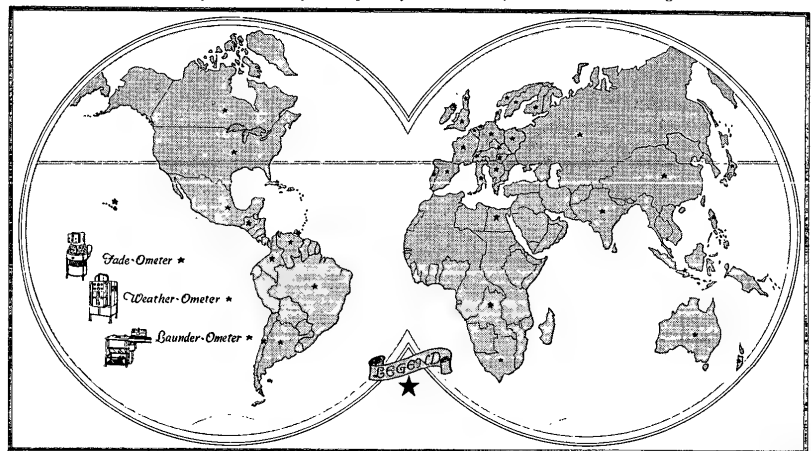
Thousands of Atlas instruments are in daily use

throughout the world, checking the quality of raw materials, safeguarding production, making it possible to make and keep guarantees, stopping rejects, complaints and adjustments; truly insurance worth any reasonable premium. The value of the millions of hours Atlas Ometers have saved thousands of users all over the world during the past thirty years in providing rapid reliable answers to quality problems, is incalculable.

Atlas Ometers are versatile enough to cover every legitimate need of the industries they are designed to serve, and do their job so well they enjoy government and engineering society endorsement. A quarter century of unremitting effort, generously aided by government, industrial and scientific associations, has made these instruments the accepted method of measuring performance prior to use.

Prior to 1918 the colorfastness of fabrics and

Used in 46 Countries throughout the World, Atlas Ometers are the only universally accepted yardsticks of accelerated testing.



similar materials was tested by exposing to sunlight—and if results were twice alike it was a coincidence! How could it be otherwise? The intensity of sunlight varies with latitude, season of year, time of day and clarity of the atmosphere. Obviously these variables prevented a common basis of testing, interpretation and action; tests could often not be run for days, or but intermittently, and never duplicated.

World War I brought restricted shipments of dyestuffs to America thus making a bad situation worse. It was into this chaotic situation Atlas introduced the Fade-Ometer. Then came in rapid succession the Weather-Ometer and Launder-Ometer.

You may refer all problems of sunfastness, launderability and weathering to the appropriate Atlas Ometers with complete confidence the prestige will be enhanced, net profit improved.

TYPE FDA-R FADE-OMETER EXPORT DATA SHEETELECTRICAL REQUIREMENTS

ALTERNATING CURRENT: The Fade-Ometer, Type FDA-R, will operate on voltages between 208 and 250. However, the voltage at the point of operation should be determined so that if a transformer is required it can be shipped with the Fade-Ometer.

If the voltage is from 185 to 207, a Booster Transformer is required. For other voltages such as 110, 440 or 550 volts, line transformers are required. See separate sheet on transformers. The Fade-Ometer operates on any two wires, or one phase, of a supply circuit having the proper voltage of 208 to 250 volts, regardless of whether it is a single phase, 2-phase, or 3-phase system. The Type FDA-R Fade-Ometer consumes about 25 amperes for a 10 minute starting period and 15 to 17 amperes running circuit, or an average of approximately 2.5 KW.

DIRECT CURRENT: The Direct Current Fade-Ometer, Type FDA-R, will operate satisfactorily on a voltage between 220 and 250. Transformers CANNOT be used on Direct Current. The Fade-Ometer, Type FDA-R, consumes about 25 amperes for a 10 minute starting period, and 12 to 14 amperes, running current, or an average of approximately 2.6 KW.

THE FOLLOWING INFORMATION IS REQUIRED WITH YOUR ORDER:

Voltage available at machine location _____ Volts Thermometer, specify degrees Fahrenheit or Centigrade _____
 Alternating - or Direct Current _____ Current Transformer voltage, if Atlas is to supply _____
 If Alternating Current, what frequency _____ Cycles

EXPORT SHIPMENTS INCLUDE THE FOLLOWING SUPPLIES:

	<u>1 YEAR</u>	<u>2 YEARS</u>		<u>1 YEAR</u>	<u>2 YEARS</u>
Carbon Electrodes	300	600	Box Type Wicks	76	152
Pyrex Globes	6	12	Vertical Wicks	16	32
Stainless Steel Specimen Holders			Test Masks SL-8a	1000	2000
Type CD-LSR (2 openings)	21	21	Test Masks CD-3	100	200
Type SL-LSR (1 long opening)	21	21	Specimen Record Cards FR-SL8	500	1000
Black Panel Thermometer, C. or F.	1	1	Specimen Record Cards 617F	500	1000
Box Type Wick Frames	19	19	Approx. \$ value of other		
Vertical Wick Frames	4	4	spare parts not listed	\$113	\$166

WEIGHTS AND MEASUREMENTS:

	<u>1 YEAR</u>	<u>2 YEARS</u>		<u>1 YEAR</u>	<u>2 YEARS</u>
Gross Weight, in pounds	805	905	Gross Weight, Metric, Kilos	366	411
Net Weight, in pounds	570	640	Net Weight, Metric, Kilos	259	291
Cubic Contents, in Cubic Feet	72	79	Cubic Contents, Cu. Meters	2.01	2.22

FLOOR SPACE: The Type FDA-R Fade-Ometer measures 43" x 33" (110 cm x 84 cm), 5 ft. 8 inches high (173 cm.). When unpacked it can be taken through a standard 32" (81 cm) door.

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EXPORT FADE-OMETER PRICE LIST -- F.A.S. ATLANTIC AND GULF PORTS OF EXIT ONLY

(Additional Charges applicable when U.S. Pacific Ports are selected) All prices in U.S. Dollars.

Included in the prices mentioned below are supplies, spare parts and accessories, sufficient for either ONE or TWO years of continuous operation, as you prefer. Such supplies are shown in the accompanying ordering data sheet. The Fade-Ometer is shipped as a self contained unit and is complete in every respect. The Atlas Automatic Float and Valve is standard construction, and for all overseas destinations, we also include the 5-Gallon Water Bottle and Bracket.

TYPE FDA-R FADE-OMETER

ALTERNATING CURRENT

within a voltage range from 208 to 250 Volts, in frequencies of

<u>60 Cycles</u>		<u>50 Cycles</u>		<u>25 Cycles</u>	
<u>One Year</u>	<u>Two Years</u>	<u>One Year</u>	<u>Two Years</u>	<u>One Year</u>	<u>Two Years</u>
<u>Supplies</u>	<u>Supplies</u>	<u>Supplies</u>	<u>Supplies</u>	<u>Supplies</u>	<u>Supplies</u>
\$1638.00	\$1992.00	\$1666.00	\$2020.00	\$1815.00	\$2174.00

DIRECT CURRENT

220 to 250 Volts

<u>One Year</u>	<u>Two Years</u>
<u>Supplies</u>	<u>Supplies</u>
\$1796.00	\$2151.00

TRANSFORMERS for A. C. only - See paragraph on accompanying data sheet "Electrical Requirements," to determine whether a transformer is needed. CONSULT YOUR ELECTRICAL DEPARTMENT.

YOUR FADE-OMETER ORDER CANNOT BE FILLED UNLESS VOLTAGE, FREQUENCY, AND KIND OF CURRENT ARE STATED

Prices include export packing, freight in the U.S.A., from factory at Chicago to Port of exit, transportation from railroad terminal at port to ship's side, insurance from factory to ship's side, and all documentary and bill of lading charges except Consular Fees. Charges beyond F.A.S. Port will consist of marine insurance (all risks), ocean freight, and consular fees (if any) and will be contracted for by us and charged to the purchaser at prevailing rate on date of sailing, in addition to the regular quoted F.A.S. price. Approximate shipping weights and measurements are given on the accompanying data sheet to enable the purchaser to ascertain approximate costs not included in the F.A.S. price. It is further understood and agreed that the vendor shall not be liable for delay in or non-performance of any obligation hereunder, including delivery of any goods or merchandise, if such delay or non-performance occurs by reason of any condition beyond vendor's control and for which he is not responsible, including strikes, fire, floods, Acts of God, riot, or action of any governmental authority, domestic or foreign.

SOLE MANUFACTURERS

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE
Printed in the U.S.A.

ATLAS ELECTRIC DEVICES CO.
Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0
1114 N. Dearborn Ave., Chicago 13, Illinois

FOP-010155-055

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

TRANSFORMERS FOR ATLAS OMETERS

Transformers are required when your alternating current line voltages are other than within the range of 208 to 250 volts. We quote below separately the required capacity for each separate Ometer, and also on larger transformers to accommodate more than one Atlas Ometer, or other laboratory equipment. By combining the current capacities when more than one Ometer (plus other electrically operated laboratory machines) is operated from the power line, the most suitable transformer can be determined. As indicated on three phase operation it is sometimes more economical to utilize 2 single phase transformers instead of one 3-phase transformer.

POWER TRANSFORMERS

BOOSTER TRANSFORMERS

MODELS	<u>1-Phase</u>		<u>3-Phase Power Line</u>			<u>1-Phase</u>		<u>3-Phase Power Line</u>		
	No.	Rating	No.	Rating	Phases	No.	Code	No.	Code	
<u>Fade-Ometer:</u>										
FDA-R	1	3-KVA	1	3-KVA	Single	1	#61	1	#61	
<u>Weather-Ometer:</u>										
BWM-CC	1	3-KVA	1	3-KVA	Single	1	#61	1	#61	
SMC, SMC-H	1	5-KVA	1	5-KVA	Single	1	#61	1	#61	
SMC-R, SMC-HR	1	7½-KVA	2	5-KVA	Single	1	#63	2	#61	
DMC, DMC-H	1	7½-KVA	2	5-KVA	Single	1	#63	2	#61	
DMC-R, DMC-HR	1	15-KVA	1	15-KVA	Three	1	#64	3	#61	
XW	1	7½-KVA	1	7½-KVA	Single	1	#63	1	#63	
XW-R	1	15-KVA	2	7½-KVA	Single	1	#64	2	#63	
<u>Laundry-Ometers:</u>										
LHD-EF, LHD-AS/EF	1	5-KVA	2	3-KVA	Single	1*	#59	1*	#59	
LHD-LIQ, LHD-L2Q	1	15-KVA	1	15-KVA	Three	1*	#59	1*	#59	

*Wired in control circuit only

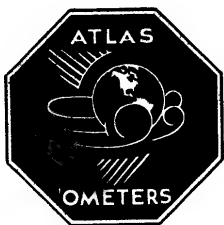
POWER TRANSFORMERS	<u>SINGLE PHASE</u>						<u>THREE PHASE</u>			
	<u>60 Cycle</u>			<u>50 Cycle</u>			<u>60 Cycle</u>	<u>50 Cycle</u>	<u>60 Cycle</u>	<u>50 Cycle</u>
PRIMARY VOLTS	<u>115</u>	<u>460</u>	<u>575</u>	<u>115</u>	<u>460</u>	<u>575</u>	<u>460</u>	<u>575</u>	<u>460</u>	<u>575</u>
WITH 230 V.										
SECONDARY										
3 KVA	\$ 58.00	\$100.00	\$104.00	\$ 62.00	\$108.00	\$113.00				
5 KVA	82.00	145.00	152.00	89.00	158.00	165.00				
7½ KVA	110.00	200.00	210.00	119.00	219.00	230.00				
15 KVA	189.00	348.00	364.00	206.00	382.00	400.00	\$440.00	\$474.00	\$476.00	\$511.00

°AUTO TRANSFORMER-Contact local power company for approval.

BOOSTER TRANSFORMERS (for line voltages of 187 to 207 Volts)

	<u>Single Phase</u>	<u>Code #59</u>	<u>Code #61</u>	<u>Code #63</u>	<u>Code #64</u>
60 Cycle		\$24.00	\$43.00	\$64.00	\$77.00
50 Cycle		25.00	46.00	68.00	84.00

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0



Atlas Electric Devices Co. • 361 West Superior Street • Chicago 10, Ill., U.S.A.

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

UNCLASSIFIED

ATLAS WEATHER-OMETERS

ACCELERATED WEATHERING



UNCLASSIFIED



Pioneered and Manufactured

by

ATLAS ELECTRIC DEVICES CO.

CHICAGO 10, ILLINOIS

U. S. A.

ACCELERATED WEATHERING

The ATLAS WEATHER-OMETER is a laboratory apparatus for ascertaining at a greatly accelerated speed the trend of reactions which can be expected in average outdoor exposures on materials.

The WEATHER-OMETER is a self-contained machine, embodying three weathering agents; namely, Synthetic June Sunlight, Mild or Vigorous Rain (water spray) and Temperature Changes.

All three of these agents, so destructive to many materials, protective and decorative coatings, are corralled, controlled and brought into play on prepared laboratory specimens, so timed and applied that the resistance to outdoor exposure of the specimen under study is proved in days instead of months or years of actual outdoor exposure.



Used the World Over

The WEATHER-OMETER is truly an accelerated weathering machine safe to operate 24 hours a day without manual attention. The name "WEATHER-OMETER" is a registered trademark, and refers only to an ATLAS ELECTRIC DEVICES CO. product. The WEATHER-OMETER was pioneered and developed by Atlas and is manufactured in its entirety in our own plant.

Sole Manufacturers

ATLAS ELECTRIC DEVICES COMPANY

361 WEST SUPERIOR ST. CHICAGO 10, ILL. U.S.A.

New Address

1114 N. Dearbornwood Ave. Chicago 13, Ill., U.S.A.

1 WO-351-Ta

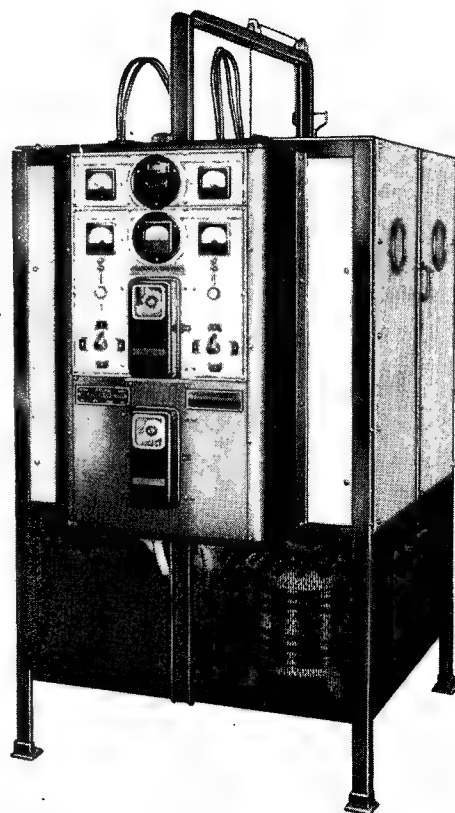
Printed in U. S. A.

ACCELERATED WEATHERING

Briefly, the WEATHER-OMETER gives an index of durability to both Manufacturer and User of the following materials; paint, varnish, lacquers, enamels, protective coatings, bitumens, asphalt, roofing, rubber, plastics, dyestuffs, rope and cordage, textiles, weather-proof wire and cable, liquids; in fact any raw or fabricated material that may be subjected to out-of-doors use in different localities and climates.

Accelerated Weathering has proven profitable in predetermining in advance of fabrication the worth of any product, intended for out-of-doors service.

The WEATHER-OMETER is an indispensable piece of equipment to those interested in learning the weather resistance of a product by providing dependable information in 1/25 of the time required for actual outdoor exposure.



The External
View of
Weather-Ometers

DLTS-X

HVDL-X

SL-TS

Made to
Order
Variable Weather
in your own
Laboratory
for 24 Hours Duty

The WEATHER-OMETER is available in two standard types; namely the Twin-Arc and Single-Arc, both of which are fully explained in this bulletin. To aid you in selecting the Type and Model best fitted for your work we have listed them in order of demand, first, the model most generally used, the Twin-Arc, and second, the Single-Arc.

Before proceeding further, it should be borne in mind that the floor space of both types is the same and that the light source, the Atlas Violet Carbon Arc, is employed in all machines. After you have acquainted yourself with the essential differences, you will better appreciate the reason for the two types.

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ATLAS WEATHER-OMETERS

THE PRINCIPLE OF ACCELERATED WEATHERING

The ATLAS Accelerated Weathering Machine operates on the following principle: If a Light Source, whose total radiation approximates Noon June Sunlight, is played on the surface of a material, under controlled temperature conditions and is followed by a water spray of known temperature, pressure and volume, the material thus exposed will take on surface and color characteristics similar to those produced by outdoor exposure, but in much less time.

With a WEATHER-OMETER as a medium, it is possible to chart the breakdown on a specimen in your own laboratory.

SOLAR vs ARC INTENSITY

Table No. 1 below shows the relationship of outdoor sunlight for 12 months to the Atlas Violet Arcs in a Twin-Arc Weather-Ometer.

The values shown in this chart are Milligrams per square cm. of oxalic acid decomposed in one hour by the action of Ultra Violet in the light source.	
*Sunlight in Indiana at Lake Michigan	Twin-Arc Light Source
Winter average 0.837 Spring and Fall Average 1.830 Summer Average 3.670	Continuous 24 Hours a Day 9.440
*Solar Data by Tonney, Somers and Marti, Journal of Preventive Medicine 2-1928 - Page 943	

Table No. 1

LIGHT SOURCE

These Weather-Ometers employ as a light source, one or two Atlas Enclosed Violet Carbon Arc Units. This arc unit is electrically and mechanically balanced and is maintained for 24 hours without operator attention.

ATLAS WEATHER-OMETERS

LIGHT SOURCE Continued

Electrically the Atlas Enclosed Violet Carbon Arc is maintained by the use of reactance transformers which insure a stable arc at a low power factor which means economy in current consumption.

The Arc operates on a potential of 130 to 145 volts at 15-17 amperes on a.c. The Weather-Ometer as a unit is designed for operation on a power line of 208 to 250 Volts a.c. Reducing the arc voltage to 130-145 is accomplished by reactance transformers which are an integral part of each Weather-Ometer.

The Arc consumes one inexpensive $\frac{1}{2}$ " x 12" carbon in each 24-hour period. This makes for economy in carbon consumption and operator's time, since the arc will automatically sustain itself for a complete day and night.

Since most of the destructive action in sunlight is produced by wavelengths below 3600 angstrom units, it is to be expected that the light source chosen for the Weather-Ometer would exceed in this region of the spectrum when compared to June Sunlight. Table No. 2 below shows the relationship in percent of total radiation between June Sunlight at Washington, D.C. and the Atlas Enclosed Violet Carbon Arc. All measurements were taken at one meter from the arc at right angles from the center of the Arc.

SPECTRAL DISTRIBUTION OF ATLAS ENCLOSED VIOLET CARBON ARC

SPECTRAL RANGE	Percent of Total Radiation to limit of fluorite Transmission in Infra-red (12,000 mμ)			
	Arc Enclosed in 9200-PX Globe		Noon ^(a) June Sunlight	
	A.C. ^(b)	D.C. ^(b)		
279 mμ to 290 mμ	0.05	0.03	0.0	
290 mμ to 320 mμ	4.6	3.9	2.0	
320 mμ to 360 mμ	6.2	6.0	2.8	
360 mμ to 480 mμ	15.0	16.1	12.6	
480 mμ to 600 mμ	8.3	9.2	21.9	
600 mμ to 1400 mμ	14.9	15.2	38.9	
1400 mμ to 4200 mμ	21.3	21.3	21.4	
4200 mμ to 12000 mμ	29.65	28.27	0.4	
(a) W.W. Coblentz, May 25, 1926				
(b) Pacini, Mar 31, 1932				

Table No. 2

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ATLAS WEATHER-OMETERS

LIGHT SOURCE Continued

In order to transmit wave-lengths otherwise retarded by common glass Atlas Violet Carbon Arcs are enclosed within an optical Pyrex Globe which transmits wave-lengths as short as 2750 actual Angstrom Units. This globe therefore filters out all wave-lengths below 2750 actual Angstrom Units not found in sunlight at sea level and therefore not desirable for the purpose.

The globe has a dual purpose as it also forms an air tight chamber permitting the Arc to function in a rarefied ionized atmosphere. This accounts for the 24 hour life of an electrode. Another function of the globe is to keep by-products of combustion from the arc from reaching the specimens or annoying those in close proximity. Thus exhaust flues, ducts or blowers are not necessary when using an Atlas Enclosed Arc Weather-Ometer.



WEATHERING CYCLE

Accelerated Weathering is frequently referred to in specifications and technical literature as the Light and Water Spray Test. Periodic wetting, followed by drying with a light source with a reasonable control of the ambient temperature at the specimen constitutes a weathering cycle.

All Weather-Ometers of the enclosed type are provided with a Cycle Meter whose function is to automatically govern the duration of the light and water period. Thus light and water spray periods of any duration or combination are possible by simply changing to another Selector Cam.

TEMPERATURE

Temperature is one of the factors in out-door weathering; by this token temperature is automatically controlled in all Weather-Ometers of the enclosed type.

ATLAS TWIN-ARC WEATHER-OMETERS

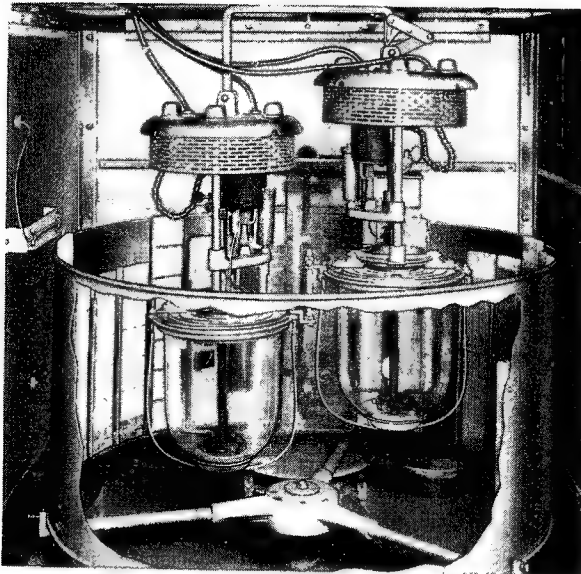
The Twin-Arc Weather-Ometer is supplied in two models, the DLTS-X and HVDL-X, which are identical in their physical dimensions and electrical requirements.

The Model DLTS-X will accommodate test specimens whose nature and coating will permit vertical suspension. See illustration below.

The Model HVDL-X will accommodate Vertical Specimens the same as the DLTS-X model, and in addition it has provisions to permit the testing of semi-solids and liquids, as well as objects of various shapes and forms which do not lend themselves to vertical suspension during the test cycle. See illustration below.

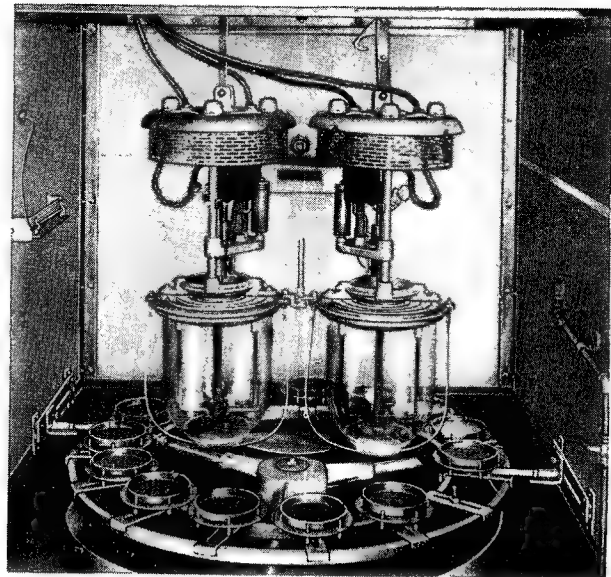
"X" FEATURE

Either machine can be used with one or two lamps as desired



The Model DLTS-X
for
Vertical Testing Only

Used for paint, lacquer, varnish, rubber, textiles, plastics, bitumens, rope, wire and cable and any other type of materials which permit vertical suspension.



The Model HVDL-X
for
Horizontal and Vertical Testing

Used both for horizontal testing of low melting point materials, liquids, shapes and solids, and for materials which permit vertical suspension as in the model DLTS-X.

ALL MODEL DLTS-X WEATHER-OMETERS CAN EASILY BE
CONVERTED INTO THE MODEL HVDL-X.

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ATLAS TWIN-ARC WEATHER-OMETERS

GENERAL CONSTRUCTION

Both models of the TWIN-ARC WEATHER-OMETER as illustrated on the preceding page are contained in a welded structural steel frame 36" x 36" x 63" high which is finished in a dark green enamel. This frame is of a rugged design which will insure long life, at least 20 years.

TESTING CHAMBER

Directly below the Arch which supports the Arc Lamps is located the enclosed testing chamber which is provided with air temperature controls. It consists of a sheet steel exterior finished in baked gray enamel, lined with stainless steel and insulated with asbestos materials and is approximately 36" x 36" x 36".

The roof or ceiling of the testing chamber is composed of three panels. The center panel supports the two arc lamps and is raised and lowered with the arc lamps, when trimming or loading the arcs, by means of a cable with suitable pulleys and lever. This center panel when in the low position remains elevated about 3/4" to guarantee adequate ventilation. Both the front and rear panels are hinged and provided with the necessary fittings so that they may be kept closed or open depending upon the temperature desired in the testing chamber.

The front of the testing chamber consists of two full length doors 17" wide which give free access to the interior of the testing chamber.

The floor of the testing chamber consists of the stainless steel water pan or sump which is fully described elsewhere in this bulletin.

BASE

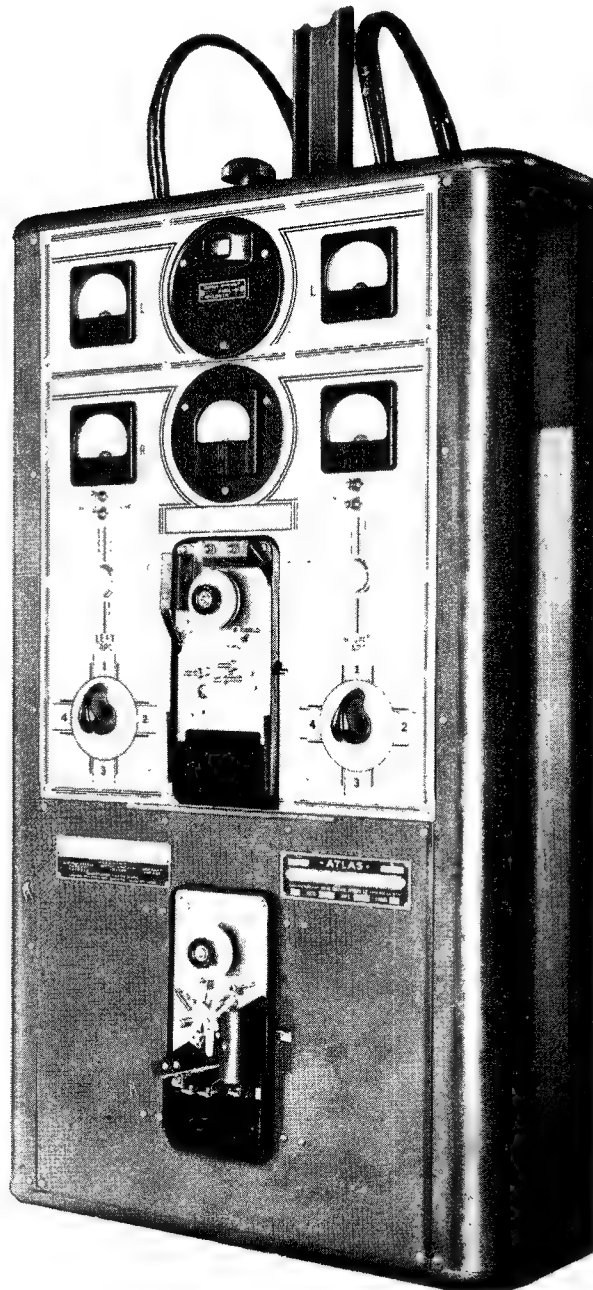
On the floor of the base of the Weather-Ometer are located the two reactors, the rheostat for compensating minor voltage changes, the drum driving mechanism and the blower assembly. This section between the floor of the base and the bottom of the testing chamber is enclosed with a perforated metal screen, giving ventilation and protection.

Legs elevate the base of the Weather-Ometer approximately eight inches from the floor providing for easy cleaning.

ATLAS TWIN-ARC WEATHER-OMETERS

CONTROL PANEL

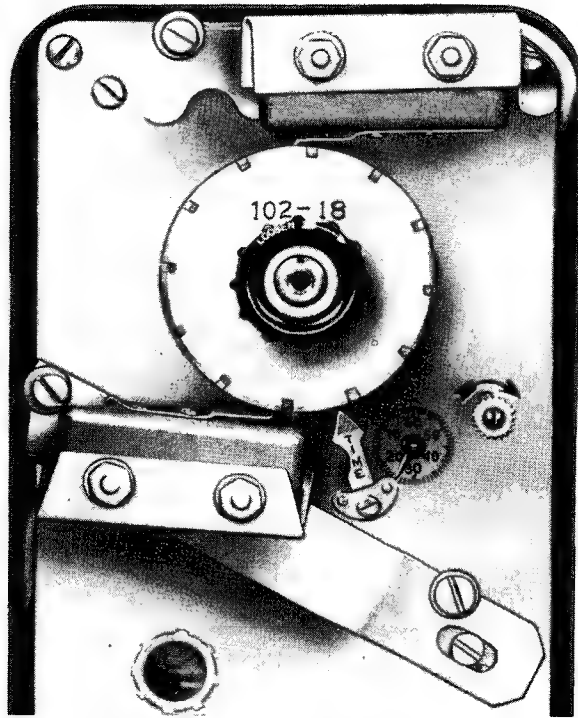
The TWIN-ARC WEATHER-OMETER is fully automatic with all control equipment conveniently located on one panel. This control panel as illustrated below is located on the left side of the testing chamber at eye level. It provides equipment both for registering and controlling the arcs, temperature, cycles, the duration of the test to date and for stopping the machine at any predetermined time.



ATLAS TWIN-ARC WEATHER-OMETERS

CONTROL PANEL Continued

CYCLE METER



It is due to the CYCLE METER that the Twin-Arc Weather-Ometers owe their great flexibility. By the utilization of interchangeable specially cut CAMS or Cycle Selectors, any type of testing cycle can be provided. These CAMS control independently the duration and interval of the Light and Water Spray periods. By selection of the proper CAM the operator can have any combination of light only, light with water spray, or water spray only.

All Twin-Arc Weather-Ometers are provided with a number of standard CAMS providing test cycles which have been found to be most efficient in their particular field.

For example the 102-18 CAM shown inserted in the Cycle Meter above provides for 102 minutes of light only followed by 18 minutes of light with water spray. This is the cycle used for most types of materials.

The 51-9 CAM illustrated on the following page is used for materials, which require a shorter wetting and drying out period as this CAM provides for 51 minutes of light only followed by 9 minutes of light with water spray.

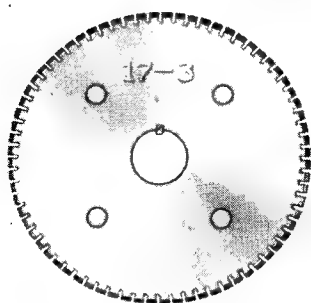
Still another Cycle Cam is employed for bituminous products giving results of the type, character, and trend encountered out of doors. Cycle Cam 13-945 GYA 529 provides a cycle of 1 hour of water only followed by 2 hours of light only; then 2 hours of water only followed by 6 hours of light only for a total of 11 hours, and is repeated once for a total of 22 hours. The remaining two hours in the day's run are either used as a rest period, or for a freezing cycle.

ATLAS TWIN-ARC WEATHER-OMETERSCONTROL PANEL ContinuedCYCLE METER

In addition to the standard CAMS, of which the three described on the preceding page are but a few of those now being used, also furnished are Blank CAMS which may either be cut by the user or returned to us for preparation of any special cycle which the user desires to try out on his particular product.

The only restriction on cutting special CAMS is that no period of light or water spray can be of less than 3 minutes or greater than 24 hours in duration and that the total time of light plus water spray should be in multiples which are divisible into 24 hours or less, as the CAM makes one revolution in 24 hours.

In order to change from one CAM to another merely remove the knurled knob holding the cam in place, remove the one CAM and replace with another CAM of the selected cycle.



STANDARD CYCLE CAMS
SUPPLIED WITH MACHINES

DLTS-X & HVDL-X

SL-TS

17-3

17-3

51-9

51-9

102-18

102-18

#13 13-945

#14 ASTM D529-

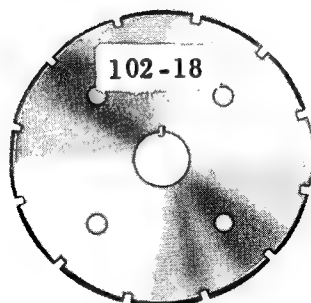
#14 ASTM D529-

39T Cycle A

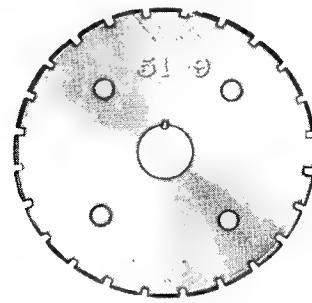
39T Cycle A

Blank *

Blank *



* This cam will be cut to your
order at No Charge.



← CAM ROTATES ONCE IN 24 HOURS →

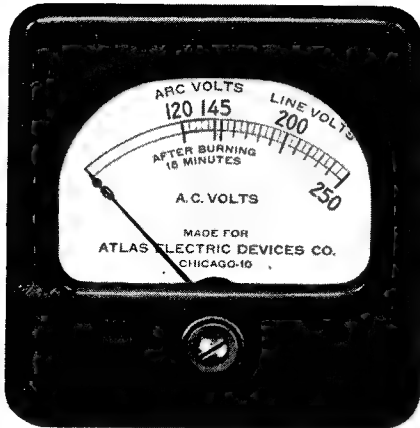


EACH RISE IN THE CAM WILL PRODUCE LIGHT, EACH INDENTATION, SPRAY

ATLAS TWIN-ARC WEATHER-OMETERS

CONTROL PANEL Continued

VOLTMETERS



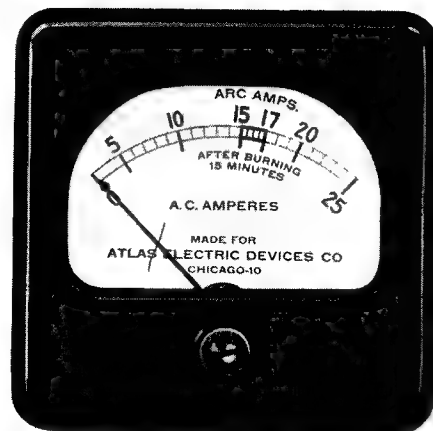
A Voltmeter for each Arc is provided in the Control Panel. Each indicates to the operator either the voltage at the Arc or the voltage of the power line to the Weather-Ometer. These Voltmeters, one for each arc, are equipped with special dials which not only permit reading of the arc or line voltage but also have indicated on their dial the proper arc volt operating range of 130-145 and line voltage from 200-250.

VOLTMETER SWITCH

A double-throw toggle switch is located directly below the two Voltmeters making it possible to switch from Line Voltage to Arc Volt reading with the same meter.

AMMETERS

Two Ammeters, one for each Arc, are located on the right side of the control panel. These indicate the actual amperes being consumed by the Arc and are equipped with special dials that not only show the amount of current being consumed but also indicate the proper range at which the arcs should be operated, 15-17 amps on a.c. or 12-14 amps on d.c.



ATLAS TWIN-ARC WEATHER-OMETERS

CONTROL PANEL Continued

RUNNING TIME METER



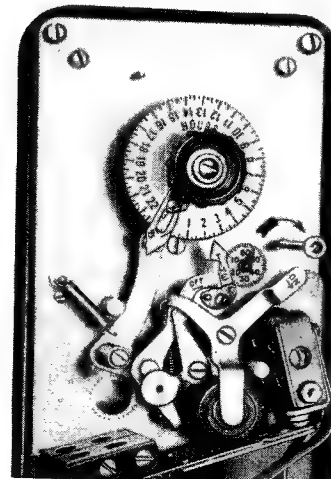
The Running Time Meter removes the personal element of maintaining an accurate log of the actual light hours received by any or all the specimens under test. By simply recording the time reading at the start of any specimen or group and likewise noting the meter reading when the specimen is removed, the difference in the two readings results in hours and tenths. The Time Meter is a telechron driven counter of the non-resetting type which makes it impossible for anyone to willfully or otherwise change the actual reading of this meter.

ON AND OFF SWITCH

This double pole toggle switch is used for manually starting and stopping the Weather-Ometer as it is the master switch for all circuits.

TIME SWITCH

The Time Switch in the lower center of the Control Panel, provides means for terminating the test or shutting down the Weather-Ometer at any predetermined time from 1 to 24 hours. This switch if undisturbed will shut off all electrical and water circuits at the end of 24 hours.

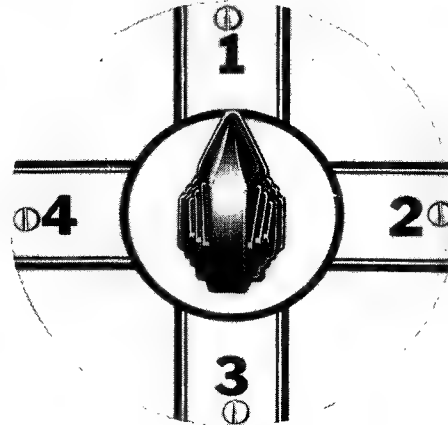


ATLAS TWIN-ARC WEATHER-OMETERS

CONTROL PANEL Continued

VOLTAGE ADJUSTMENT SWITCHES

Frequently the voltage at the location varies during the Day and Night period, but not of sufficient degree to warrant the changing of connections on the Reactor Transformer. In order to conveniently increase or decrease resistance in the Arc circuit, each arc is provided with a Voltage Adjustment Switch. Position No. 1 has the maximum resistance in the circuit for high voltage and No. 4 the minimum resistance when voltage is low, usually at the peak hour.



PILOT LIGHTS

Two Pilot Lights in red indicate that the Weather-Ometer circuit is energized even though the arc lamps and water spray may have been turned off by the time switch.

THERMO REGULATOR



In order to raise or lower the temperature within the test chamber a Thermo Regulator with a visible dial is provided. This regulator governs the volume of air introduced into the test chamber. Thus a range of 110° to 180° F. ambient temperature $\pm 5^\circ$ F. is possible.

The Thermo Regulator is adjusted to correspond to Black Panel Temperatures which is higher than Ambient.

ATLAS TWIN-ARC WEATHER-OMETERSWATER SPRAY

The two most important factors in an accelerated weathering test are Synthetic Sunlight and Water Spray, each so timed to be most effective on the subject under test.

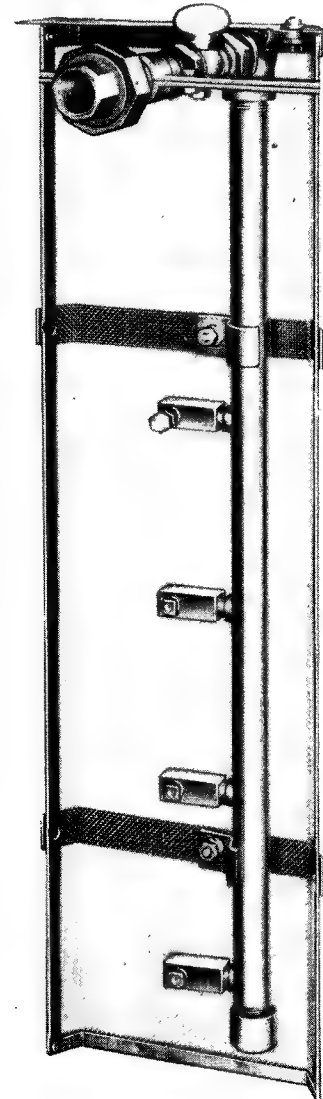
Since the Cycle Time Meter which governs the duration of the Light and Spray periods is fully explained elsewhere this discussion will concern only the water spray system on an Atlas Twin-Arc Weather-Ometer.

It should be borne in mind that the specimen spray is only in action when the Cycle Cam demands spraying at which time the spray issues from a series of four vertical nozzles, as illustrated on the right, and delivers a volume of water on each vertical row of specimens as they rotate past the nozzles once every minute or 1.5 inches per second.

The actual amount of water delivered by the specimen spray unit varies with the type of spray nozzle in use at the time and the water pressure at the nozzles. Table No. 3 below shows pints of water per minute delivered during the spray period by the various type nozzles at different pressures.

Type of Nozzles Used	Pints of water per minute for Specimen Spray(4 nozzles) at indicated nozzle pressures					
	10	12	14	16	18	20
#60 Very Fine Mist	2.6	2.8	3.0	3.2	3.4	3.6
#50 Fine Mist	3.9	4.4	4.7	4.9	5.2	5.5
#FT Heavy Sheet Spray	6.3	6.8	7.2	7.6	7.9	8.2

Table No. 3

#60
Very
Fine#50
Fine
Mist#FT
Heavy
Sheet

ATLAS TWIN-ARC WEATHER-OMETERS

HORIZONTAL SPECIMEN SPRAY

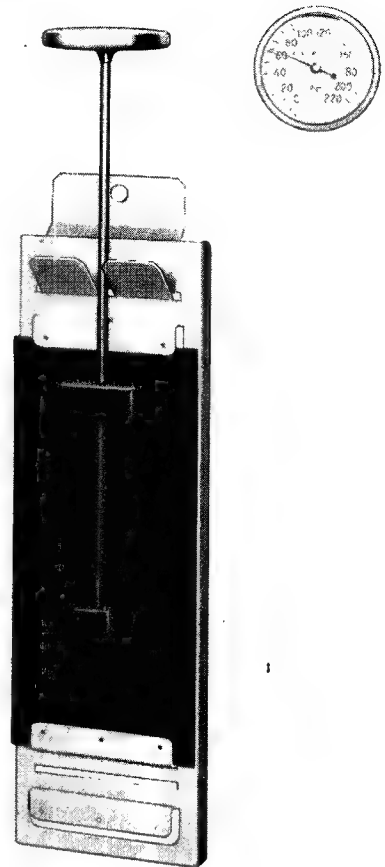
A suitable Spray Unit is supplied with each HVDL-X Weather-Ometer for use when a spray cycle is desired on horizontally mounted specimens. As this unit utilizes only two nozzles of the type used in the vertical specimen spray, the volume of water delivered is 50% of the amounts indicated in Table No. 3.

SPECIMEN TEMPERATURES

In making Accelerated Weathering tests, the subject of temperature is usually one of grave concern since there are three possible temperatures, surface, ambient and embeded film, to be considered.

Since the materials to be tested may vary in shade from black to white with different heat absorbing rates, it has been tentatively agreed upon by the industry to record temperatures with a Black Panel Thermometer. This device as illustrated, is a stainless steel panel .032" thick with approx. 100 sq. cm. of surface on which is mechanically fastened a bimetallic dial type thermometer with the entire surface covered with two coats of black baking enamel.

Black Panel Temperatures are approx. 30° F. higher in the Weather-Ometer testing range than ambient temperatures and the Thermo Regulator controlling the temperature within the test chamber is calibrated to indicate the selected Black Panel temperature and not ambient temperature.



DRUM COOLING SPRAY

Should the temperature in the test chamber be excessive for the material under test, a two-nozzled water spray is provided which plays on the outside of the testing drum. This side spray should not be confused with the Specimen Water Sprays which simulate rain fall. The sole purpose of the Drum Cooling Spray is to remove by conduction excess heat from the test chamber and at the same time increase the relative humidity.

ATLAS TWIN-ARC WEATHER-OMETERS

SUMP

The spent water from the sprays is collected in a stainless steel reservoir covering the entire area of the base, 36" x 36", and is located directly below the specimen drum. A suitable screened drain is provided of 1 $\frac{1}{4}$ " pipe.

WATER PIPES AND FITTINGS

All necessary pipes, fittings and electric valves are an integral part of the Weather-Ometer. This water system all of copper and brass insures delivery at the specimens of water free of rust or contamination from the water system.

Aluminum piping and fittings are available for deionized systems.

WATER PRESSURE

The effective water pressure required to operate the machine is 25 pounds per square inch (25 P.S.I.). Furnished as an integral part of the water system is a Pressure Regulator 25 to 80 Lbs. and a Pressure Gauge preceded by a 200 mesh Strainer of monel metal.

REVOLVING DRUM SPIDER

Both the Vertical Testing Drum and Horizontal Testing Rack when in use are mounted on and supported by the Revolving Drum Spider. This spider is constructed of brass and is rotated constantly at 1 r.p.m. through a friction drive by the motor operated driving mechanism. This provides a uniform exposure for all samples both to the light source and water spray.

VENTILATION SYSTEM

The Twin-Arc Weather-Ometer is equipped with a motor driven squirrel cage type blower actuated by the Thermo Regulator. This blower delivers 500 C.F.M. of air providing a two-fold action of lowering the ambient temperature of the testing chamber and introducing air for oxidation. The air is directed through ducts and baffles to selected points within the testing chamber thus assuring maximum efficiency.

ATLAS TWIN-ARC WEATHER-OMETERS

VERTICAL SPECIMEN DRUM

In order to support test specimens in a vertical plane when rotating them around the light source an aluminum drum 31" I.D. x 16 $\frac{1}{2}$ " in depth is employed. The thickness of the specimen holders furnished are of such dimensions that they will bring the exposure surface or face of the test specimen within a circular plane of 30" in diameter as called for in all testing procedures.

The entire inner periphery of this open ended cylinder is fitted with equi-spaced vertical rails which will accommodate 30 double specimen holders, as illustrated on the following page, or 60 test panels 2-3/4" in width and 6-3/4" in length. Smaller samples correspondingly increase the capacity of the machine.

The sample holding arrangement of the drum is so designed that practically any type and kind of material that lends itself to be suspended in a vertical position may be conveniently be placed in a Weather-Ometer. See Page No. 6 for illustration of Vertical Specimen Drum in place.

HORIZONTAL TESTING RACK

When it becomes desireable to conduct an accelerated weathering test on materials and objects which do not permit vertical suspension, a circular testing rack is used in place of the Vertical Testing Drum.

This Rack or Fixture as illustrated on Page No. 6 rests on the same rotating spider which supports the Drum. It is provided with 15 upright studs acting as an axis for the 15 Turn Tables 5" in diameter. Upon these Turn Tables may be placed Petri dishes or odd shaped objects.

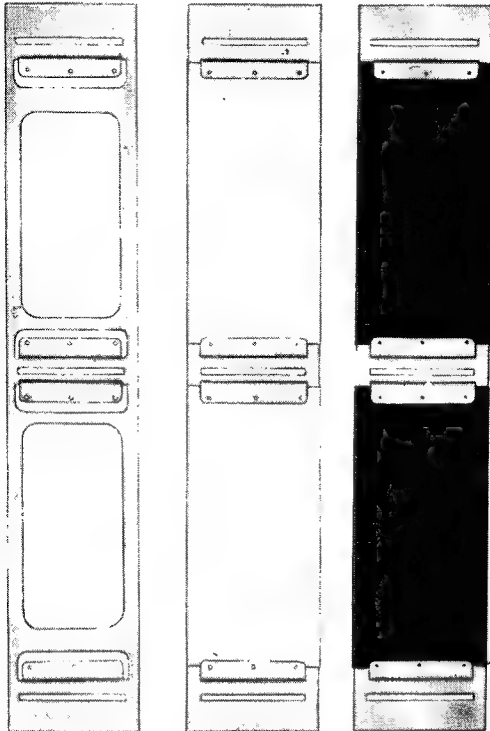
The 15 Turn Tables progress around the Arcs at 1 r.p.m. twice during each revolution each turn table makes mechanical contact with a leaf spring causing the turn table to make a 1/6 revolution on its own axis. In this manner each turn table rotates once in every three revolutions of the Testing Rack.

When using the Horizontal Testing Rack the Right-hand Arc is lowered to bring both Arcs to an equal distance from the object.

The Weather-Ometer is designed to take both Vertical and Horizontal specimens in the Model HVDL-X.

ATLAS TWIN-ARC WEATHER-OMETERS

SPECIMEN HOLDERS



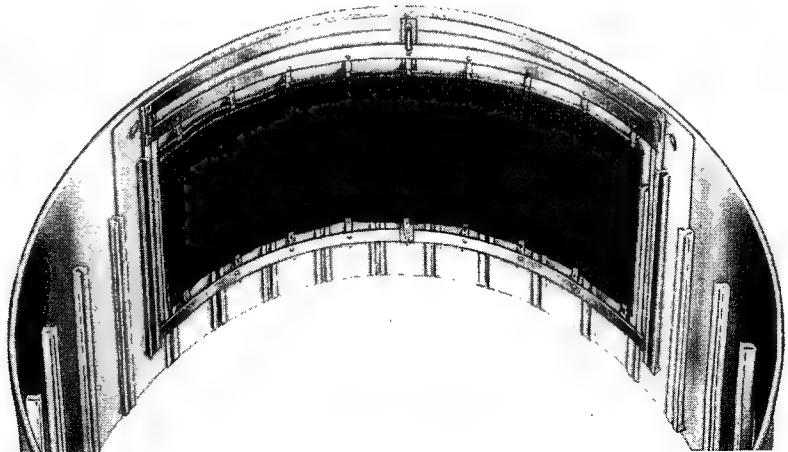
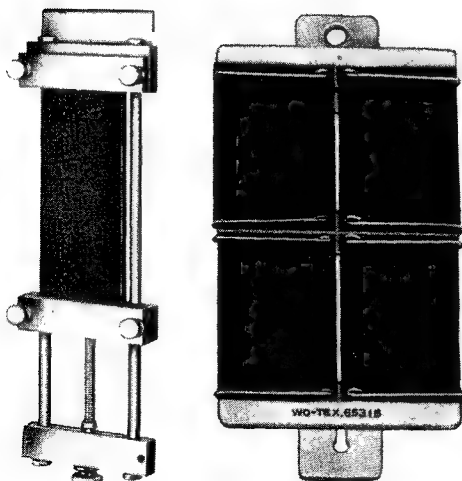
Specimens of any conceivable type and kind of material may be placed in a Weather-Ometer for testing. A wide variety of standard specimen holders for protective coatings on metal or wood, rubber, plastics, textiles, cable or rope are available, a few of which are described and illustrated on this page.

The specimen sizes most generally used are 2-3/4" x 5-7/8", 3" x 6", 10" x 28", wire cable and rope from 1/8" to 3" O.D., Rubber under tension 2-7/8" x 6-3/4", Semi-solids (receptacles) capacity 100 C.C., surface 100 sq. cm., molded shapes 1/4 to 16 Cu. Inches.

A turn table is used when testing semi-solids or molded shapes. See Page 6.

The capacity of the standard Testing Drum is 30 double holders or 60 specimens 2-3/4" x 5-7/8".

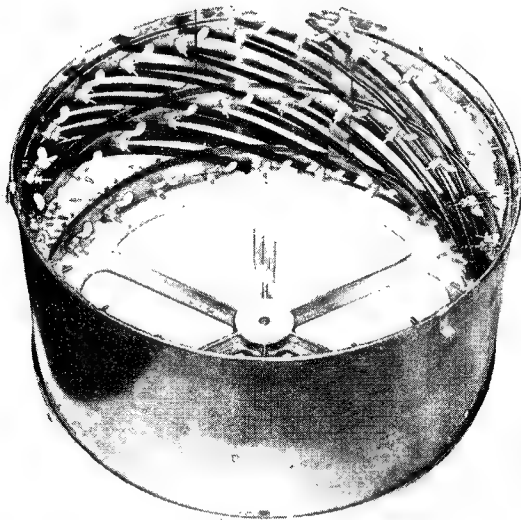
All vertical specimen holders are of the open back type to permit a free flow of air on the back of the specimen. Non-corrosive material such as aluminum, monel, stainless steel and brass is used in the fabrication of the holders. Special Holders to support objects not mentioned can be made to order.



ATLAS TWIN-ARC WEATHER-OMETERS

SPECIAL TESTING DRUMS

THE TYPE BCS FOR WIRE AND CABLE



Weather-Ometer tests of insulated wire and cable require a special drum instead of the standard drum with grooved slots. The Type BCS Drum illustrated is interchangeable with the standard drum. It provides simultaneous testing on as many as 24 pieces of wire or cable in lengths of 30" in sizes from No. 4 to No. 0000.

The clamps are so arranged that the wires are suspended at an angle of approximately 33 degrees from the horizontal thus permitting the maximum number of specimens of sufficient length for proper testing to be exposed at one time. If wires smaller than No. 4 are to be tested smaller clamps can be furnished.

For the testing of wire and cable in sizes larger than No. 0000 a special drum is required. These can be furnished together with the necessary enlargements of the Weather-Ometer testing chamber which will permit testing of wire and cable in sizes up to 3" in diameter. Complete details upon request.

SPECIAL DRUMS FOR OTHER MATERIALS

Special Specimen Drums can also be furnished for materials where the weight or size of the specimens do not lend themselves for use in the standard drum. For example when testing slabs of concrete because of the added weight a special reinforced drum may be necessary. Drums can also be furnished for the testing of large specimens which could not be inserted in the standard drum.

Complete details will be furnished upon receipt of information giving size, weight and nature of material to be tested.

Accelerated Weathering thus is not limited to a definite restricted field but can be adapted to any type of product. The Weather-Ometer thus is a very flexible tool which has proved its worth many times over in thousands of laboratories over the entire world.

ATLAS TWIN-ARC WEATHER-OMETERS

OPERATING INSTRUCTIONS

Each Weather-Ometer is accompanied by complete instructions outlining the very simple duties required of the operator and giving detailed information covering the installation, operation and care of the Weather-Ometer. Any electrician can set up the Weather-Ometer by following the simple instructions and no mechanically trained personnel is required to keep the unit in daily operation.

OPERATOR SAFETY

Mechanically and Electrically the Weather-Ometer offers no opportunity for personal injury as all moving and live parts are protected. Pilot lights indicate the electrical status of the power circuit and the entire mechanism is well grounded.

GENERAL DATA

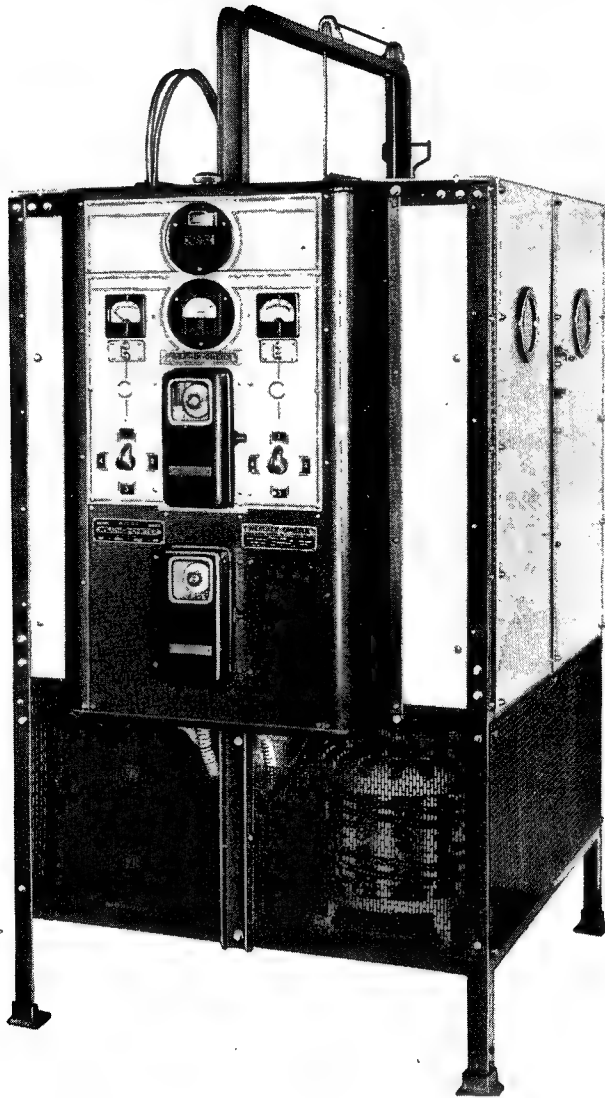
Floor space required, electrical and water requirements, weights, supplies and accessories for the various models are all listed on the last page of this bulletin.

EXPORT

When ordering Weather-Ometers for export, it must be borne in mind that the Export Price List must be consulted. Export Prices are the same as Domestic only that additional charges are made for overseas packing and for a choice of supplies to operate the machine continuously for one or two years.

ATLAS SINGLE-ARC WEATHER-OMETERS

ENCLOSED MODEL SL-TS



Model SL-TS
Single-Arc Weather-Ometer

For those to whom rapidity of test results is not the prime consideration the Single-Arc Weather-Ometer will prove to be a reliable piece of equipment for accelerated weathering tests as it was for the 15 years prior to introduction of the Twin-Arc Line of Weather-Ometers in 1941.

The Enclosed Single-Arc Model SL-TS Weather-Ometer is a very flexible instrument and is identical in all respects to the Twin-Arc Weather-Ometer as described in this bulletin with the exception that instead of Two Violet Carbon Arcs, one Arc only is employed.

SINGLE ARC vs SUNLIGHT

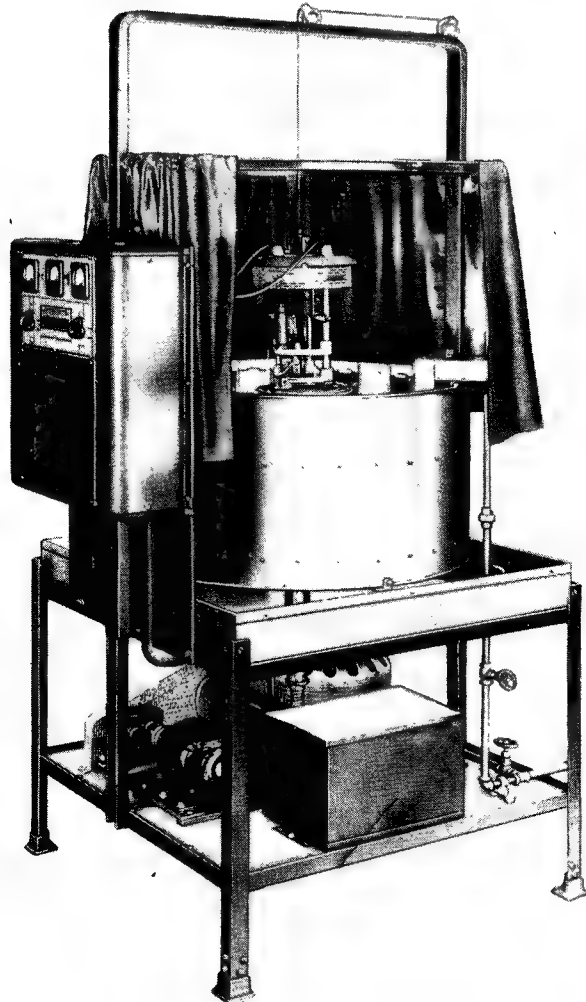
Table No. 1, Page 3, compares Ultra Violet Radiation of the Twin-Arc and Sunlight. Using the same method of determination, the Single-Arc decomposes 4.95 milligrams of oxalic acid per Sq. cm. in one hour as compared to 9.44 for the Twin-Arc.

In view of the amount of ultra violet received at the test specimens it is to be expected that the Single-Arc Weather-Ometer will take twice the time necessary to produce the same results in the Twin-Arc.

The Enclosed Model SL-TS Single-Arc Weather-Ometer like the Twin-Arc incorporates the latest developments in accelerated weathering equipment. The Cycle Meter, by simple change of the Cam or Dial, will automatically provide any combination of light and spray periods desired. Together with temperature control, improved water spray and drum revolution of 1 R.P.M. the Model SL-TS provides test conditions heretofore not possible with Single-Arc Weather-Ometers.

ATLAS SINGLE-ARC WEATHER-OMETERS

OPEN MODEL BWM-CC



The Open Model Single-Arc BWM-CC Weather-Ometer with the exception of minor refinements and improvements is the original Weather-Ometer which was pioneered and developed by Atlas over 20 years ago.

It is a thoroughly dependable instrument and was the machine called for in all specifications written before introduction of our Twin-Arc Weather-Ometers in 1941.

Although rapidly being replaced by the Twin-Arc Weather-Ometer the Open Model Single-Arc BWM-CC is still a valuable instrument for grading and sorting where the factors of speed and control of temperature and humidity are relatively unimportant.

Its fixed cycle of 17 minutes light and 3 minutes spray is produced by the specimens traveling through a shielded water spray once in each 20 minute revolution of the testing drum. Thus the operator does not have the wide selection of light and spray

periods now demanded and only enjoyed with the Twin-Arc Models.

The temperature of the test specimen in this model although not automatically controlled never becomes abnormally high, since the specimens enter the shielded water spray once every 20 minutes.

The Open Model Single-Arc like all Weather-Ometers employs the Atlas Violet Carbon Arc as previously described in this bulletin. This model is of the same rugged and long life construction as all other models and occupies the same floor space with the same general electrical and water requirements.

Since this model employs only one Arc it is to be expected that twice the time will be consumed in testing as compared with a Twin-Arc Weather-Ometer.

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0
REPRESENTATIVE WEATHER-OMETER USERS IN THE U. S. A.

AERONAUTICAL

Bell Aircraft Corp.*.....Buffalo, N.Y.
 Boeing Aircraft Corp.*.....Seattle, Wash.
 Chance Vought Aircraft Co.*.....Stratford, Conn.
 Fairchild Engine & Airplane Corp.*.....New York, N.Y.
 Higgins Aircraft Inc.*.....Higgins, La.
 Lockheed Aircraft Corp.....Burbank, Calif.

AUTOMOTIVE

Anderson Co.....Gary, Ind.
 Edward G. Budd Co.....Detroit, Mich.
 Budd Mfg. Co.*.....Philadelphia, Pa.
 Chrysler Corp.(2)*.....Highland Park, Mich.
 Deere & Company.....Moline, Ill.
 Divco Twin Truck Co.....Detroit, Mich.
 Fisher Body Corp.....Detroit, Mich.
 Ford Motor Co.....Highland Park, Mich.
 International Harvester Co.(2)*.....Chicago, Ill.
 Nash Kelvinator Corp.*.....Detroit, Mich.
 A.O. Smith Corp.....Milwaukee, Wis.
 Studebaker Corp.....South Bend, Ind.

BITUMENS AND RELATED PRODUCTS

Anderson-Prichard Oil Corp....Oklahoma City, Okla.
 Ashland Oil & Refining Co.....Catlettsburg, Ky.
 Atlantic Refining Co.....Philadelphia, Pa.
 Barber Asphalt Co.....Barber, N.J.
 Barrett Co.(4)*.....Edgewater, N.J.
 Barrett Co.....Chicago, Ill.
 Carbide & Carbon Chemicals Corp..Charleston, W.Va.
 Philip Carey Mfg Co.(3).....Lockland, Ohio.
 Celotex Corp.....Marrero, La.
 Certain-teed Products Corp.(4).....Chicago, Ill.
 Cities Service Asphalt Products Co....Warner, N.J.
 Col-Tex Refining Co.....Colorado, Tex.
 Creo-Dipt Co., Inc.....N. Tonawanda, N.Y.
 El Rey Products Co.....Los Angeles, Calif.
 Flintkote Co.(3).....E. Rutherford, N.J.
 Ford Roofing Products.....Vandalia, Ill.
 Gilmore Oil Co.*.....Los Angeles, Calif.
 Huskey Refining Co.*.....Cody, Wym.
 Johns Manville Corp. (5).....Manville, N.J.
 Johns Manville Corp.....Marrero, La.
 Johns Manville Corp.....Pittsburg, Calif.
 Johns Manville Corp.....Waukegan, Ill.
 Keasby & Mattison.....Ambler, Pa.
 Lehon, Co.....Wilmington, Ill.
 Lion Oil Co.*.....Eldorado, Ark.
 Masonite Corp.....Laurel, Miss.
 Mitchell & Smith Inc.....Detroit, Mich.
 Pan American Refining Co.....Baltimore, Md.
 Paraffine Companies, Inc.(2)....Paraffine, Calif.
 Petrol Corp. (2)*.....Los Angeles, Calif.
 Phillips Petroleum Co.*.....Bartlettsville, Okla.
 Pioneer Flintkote Co.(2).....Los Angeles, Calif.
 Richfield Oil Co. of Calif.(2).Los Angeles, Calif.
 Ruberoid Co.(2)*.....Bound Brook, N.J.
 Shell Development Co.....Emeryville, Calif.
 Shell Oil Co.....Los Angeles, Calif.
 Shell Union Oil Co.....Brooklyn, N.Y.
 Sinclair Refining Co.....Marcus Hook, Pa.
 Socony-Vacuum Oil Co.(2)*.....Brooklyn, N.Y.
 L. Sonneborn Sons, Inc.*.....Belleville, N.J.
 Standard Oil Co. of Calif.....Richmond, Calif.
 Standard Oil Co. of Ind.....Whiting, Ind.
 Standard Oil Co. of Ind.....Wood River, Ill.

Standard Oil Co. of N.J. (2).....Bayway, N.J.
 Staso Milling Co.....Bound Brook, N.J.
 Texas Company.(2).....Beacon, N.Y.
 Texas Company.....Lockport, Ill.
 Texas Company.....Port Arthur, Tex.
 Texas Company.(2).....Port Neches, Tex.
 Tidewater Oil Co.....Newark, N.J.
 Tilo Roofing Co.....Stratford, Conn.
 Trumbull Asphalt Co.....Chicago, Ill.
 Union Oil Co. of Calif.....Oleum, Calif.
 Union Oil Co. of Calif.(2).....Wilmington, Calif.
 U.S. Gypsum Co.*.....Chicago, Ill.
 Universal Oil Products*.....McCook, Ill.

COMMERCIAL LABORATORIES

A.W. Dow, Inc.....New York, N.Y.
 Bowser-Morner Testing Labs.....Dayton, Ohio.
 Electrical Testing Labs.....New York, N.Y.
 Robert W. Hunt Co.....Chicago, Ill.
 Pease Laboratories.....New York, N.Y.
 Pittsburgh Testing Labs.(2).....Pittsburgh, Pa.
 Samuel P. Sadlter & Son Inc.....Philadelphia, Pa.
 Twining Labs.....Fresno, Calif.
 Underwriters, Labs.....Chicago, Ill.
 U.S. Testing Co.(2)*.....Hoboken, N.J.
 Wayne Labs.....Waynesboro, Pa.

DYESTUFFS, CHEMICALS AND PLASTICS

Advance Solvent & Chemical Corp..Jersey City, N.J.
 American Bemberg Corp.*.....Port Rayon, Tenn.
 American Cyanamid Co.(2)*.....Stamford, Conn.
 Aridye Corp.*.....Fair Lawn, N.J.
 Bakelite Corp.....Scarsdale, N.Y.
 Baker Castor Oil Co.*.....Bayonne, N.J.
 Briktex Mfg. Co.....S. Kearney, N.J.
 Calco Chemical Div.*.....Bound Brook, N.J.
 Distillation Products.....Rochester, N.Y.
 Dow Chemical Co.(3).....Midland, Mich.
 E.I. DuPont de Nemours & Co.(4)*..Wilmington, Del.
 E.I. DuPont de Nemours & Co....New Brunswick, N.J.
 Duramold Div.*.....New York, N.Y.
 Eastman Kodak Co.....Rochester, N.Y.
 Emery Industries Inc.....Ivorydale, Ohio.
 Eronel Industries.*.....Los Angeles, Calif.
 Eronel Services*.....Mineola, N.Y.
 Hercules Powder Co.....Mansfield, Mass.
 Hercules Powder Co.....Parlin, N.J.
 Hercules Powder Co.(2).....Wilmington, Del.
 Hoover Color Corp.....New York, N.Y.
 General Dyestuff Corp.*.....New York, N.Y.
 General Printing Ink.....New York, N.Y.
 Inertol Company Inc.....Newark, N.J.
 Kirker Chemical Co.....Patterson, N.J.
 Maas & Waldstein Co.....Newark, N.J.
 Monsanto Chemical Co.....Boston, Mass.
 Monsanto Chemical Co.....Dayton, Ohio.
 Monsanto Chemical Co.(2)*....Indian Orchard, Mass.
 Plaskon, Inc.....Toledo, Ohio.
 Pro-phy-lac-tic Brush Co.*.....Florence, Mass.
 Solvay Process Co.....Syracuse, N.Y.
 Tennessee Eastman Corp.....Kingsport, Tenn.
 U.S. Industrial Chemicals.(2)*.....Newark, N.J.

ELECTRICAL AND MECHANICAL PRODUCTS

Benjamin Electric Mfg Co.*.....Des Plaines, Ill.
 Federal Telephone & Radio Labs.*....New York, N.Y.

*Indicates Twin-Arc Weather-Ometers
 Figures in parenthesis show number of machines at that location.

REPRESENTATIVE WEATHER-OMETER USERS IN THE U. S. A.

Hazeltine Electronics Corp.*.....Little Neck, N.Y.
 Irvington Varnish & Insulator Co.....Irvington, N.J.
 Mine Safety Appliances Co.....Pittsburgh, Pa.
 Veeder-Root Inc.....Hartford, Conn.
 Western Electric.....Chicago, Ill.
 Westinghouse Elec. & Mfg. Co.....E.Pittsburgh, Pa.
 Westinghouse Elec. & Mfg. Co.....Sharon, Pa.

MISCELLANEOUS

Bemis Bros. Bag Co.*.....St. Louis, Mo.
 Chesapeake & Ohio Ry.....Cleveland, Ohio.
 Congoleum-Nairn Inc.(2)*.....Kearny, N.J.
 DiNoc Mfg. Co.....Cleveland, Ohio.
 Jos. Dixon Crucible Co.....Kearny, N.J.
 Douglas Fir Plywood Assn.....Tacoma, Wash.
 General Electric Co.....Bridgeport, Conn.
 General Electric Co.....Ft. Wayne, Ind.
 General Electric Co.(2).....Philadelphia, Pa.
 General Electric Co.....Erie, Pa.
 General Electric Co.(2)*.....West Lynn, Mass.
 R.M. Hollingshead Corp.(2)*.....Camden, N.J.
 Inland Glass Co.....Chicago, Ill.
 S.C. Johnson & Son.....Racine, Wis.
 R. H. Macy Co.*.....New York, N.Y.
 Minnesota and Ontario Paper Co..Int'l Falls, Minn.
 N.Y., N.H. & H. R.R.....New Haven, Conn.
 Pantasote Leather Co.*.....Passaic, N.J.
 Revere Copper & Brass Inc.....Baltimore, Md.
 Scovill Mfg. Co.....Waterbury, Conn.
 Sears Roebuck & Co.....Chicago, Ill.
 Sherrille Research Corp.*.....Peru, Ind.
 Smith-Corwin Inc.....Irvington, N.J.
 Southern Pacific Co.*.....Sacramento, Calif.
 Truscon Labs.....Detroit, Mich.
 Union Pacific R.R. Co.....Omaha, Neb.
 U.S. Radium Co.*.....New York, N.Y.
 Montgomery Ward & Co.....Chicago, Ill.
 Western Shade Cloth.....Chicago, Ill.

PROTECTIVE AND DECORATIVE COATINGS

Advance Paint Co.....Indianapolis, Ind.
 Aluminum Co. of America.....Pittsburgh, Pa.
 Alston Lucas Co.....Lyons, Ill.
 American Paint & Chemical Co.....Ambler, Pa.
 American Paint Works.....New Orleans, La.
 American Smelting & Refining Co.....Maurer, N.J.
 American Zinc Oxide Co.....Columbus, Ohio.
 Armstrong Paint & Varnish Works.....Chicago, Ill.
 Baltimore Paint & Color Works.*.....Baltimore, Md.
 Boydell Bros. White Lead & Color Co.Detroit, Mich.
 Brooklyn Varnish Mfg. Co.*.....Brooklyn, N.Y.
 H.B. Davis Co.*.....Baltimore, Md.
 Dearborn Glass Co.....Chicago, Ill.
 DeSoto Paint & Varnish Co.....Memphis, Tenn.
 E.I. Du Pont de Nemours & Co.....Curtis Bay, Md.
 E.I. Du Pont de Nemours & Co. Parlin, N.J.
 E.I. Du Pont de Nemours & Co.(3)*.Wilmington, Del.
 Enterprise Paint Mfg. Co.....Chicago, Ill.
 Federal Varnish Co.....Chicago, Ill.
 Ferro Enamel Corp.....Cleveland, Ohio.
 Banj.Franklin Paint & Varnish Co.Philadelphia, Pa.
 Leon Finch Ltd.*.....Los Angeles, Calif.
 W.P. Fuller Co.....San Francisco, Calif.
 Gilman Paint & Varnish Co.*.....Chattanooga, Tenn.
 Hanna Paint Mfg. Co.....Columbus, Ohio.
 Hercules Powder Co.....Parlin, N.J.
 Hercules Powder Co.(2).....Wilmington, Del.
 Hooker Glass & Paint Mfg. Co.....Chicago, Ill.

Interchemical Corp.....Cincinnati, Ohio.
 Interchemical Corp.....New York, N.Y.
 Inter-Coastal Paint Corp.....East St. Louis, Ill.
 I.F. Loucks Inc.....Seattle, Wash.
 The Lilly Co.....High Point, N.C.
 Lino Paint Co.....Cleveland, Ohio.
 McGraw Paint & Asphalt Co.....Chicago, Ill.
 Marietta Paint & Color Co.*.....High Point, N.C.
 Midland Industrial Finishes Co.....Waukegan, Ill.
 Monad Paint & Varnish Co.....Philadelphia, Pa.
 J.W. Mortell & Co.....Kankakee, Ill.
 National Lacquer & Paint Co.*.....Chicago, Ill.
 National Lead Co.....Brooklyn, N.Y.
 National Lead Co.....Phoenix, N.J.
 B.F. Nelson Mfg. Co.....Minneapolis, Minn.
 New Jersey Zinc Co.*.....Palmerton, Pa.
 New Wrinkle Inc.....Dayton, Ohio.
 Nox-Rust Corp.*.....Chicago, Ill.
 Patterson Sargent Co.....Cleveland, Ohio.
 Peaslee Gaulbert Paint & Varn. Co.Louisville, Ky.
 Pittsburgh Plate Glass Co.*.....Creighton, Pa.
 Pittsburgh Plate Glass Co.....Milwaukee, Wis.
 Plastic Film Corp.....Plainfield, Conn.
 Preservative Paint Co.*.....Seattle, Wash.
 R-B-H Dispersions Inc.....Bound Brook, N.J.
 Prismo Laboratories (2)*.....Huntington, Pa.
 Red Spot Paint & Varnish Co.....Evansville, Ind.
 Reilly Tar & Chemical Co.....Indianapolis, Ind.
 Reliance Varnish Co.....Louisville, Ky.
 Reynolds Metal*.....Louisville, Ky.
 Roxalin Flexible Finishes.....Elizabeth, N.J.
 Illinois Paint Works.....Chicago, Ill.
 Rostone Inc.....Lafayette, Ind.
 Seidlitz Paint & Varnish Co.*...Kansas City, Mo.
 Selectronics Dispersions Inc.....Montclair, N.J.
 Sewall Paint & Varnish Co.....Kansas City, Mo.
 Sherwin Williams Co.(2).....Chicago, Ill.
 Sherwin Williams Co.....Cibbsboro, N.J.
 Sherwin Williams Co.....Newark, N.J.
 James B. Sipe Co.....Pittsburgh, Pa.
 Steelcote Mfg. Co.....St.Louis, Mo.
 John A. Stein Varnish Co.....Chicago, Ill.
 Thresher Varnish Co.....Dayton, Ohio.
 Tropical Paint & Oil Co.....Cleveland, Ohio.
 E.T. Trotter Co.....Brooklyn, N.Y.
 Wardway Paint Works.....Chicago Heights, Ill.
 Weatherbest Stained Shingles.....Tonawanda, N.Y.
 Wesco Waterpaints Inc.*.....East Boston, Mass.
 Western States Lacquer Co.*.....Maywood, Calif.

RUBBER AND RELATED PRODUCTS

Firestone Tire & Rubber Co.*.....Akron, Ohio.
 B.F. Goodrich*.....Akron, Ohio.
 Goodyear Tire & Rubber Co.*.....Akron, Ohio.
 Hodgman Rubber Co.*.....Framingham, Mass.
 U.S. Rubber Co.*.....Bristol, R.I.
 U.S. Rubber Co.*.....Mishawaka, Ind.
 U.S. Rubber Co.(2)*.....Passaic, N.J.
 R.T. Vanderbilt Co. Inc.*.....East Norwalk, Conn.

SCHOOLS, INSTITUTES AND HIGHWAY DEPTS.

Armour Research Foundation*.....Chicago, Ill.
 Brooklyn Technical High School.....Brooklyn, N.Y.
 Illinois State Highway Dept.....Springfield, Ill.
 Lehigh University*.....Bethlehem, Pa.
 Mass. Inst. of Technology*.....Cambridge, Mass.
 Mich. State Highway Dept.....Ann Arbor, Mich.

*Indicates Twin-Arc Weather-Ometers

Figures in parenthesis show number of machines at that location

North Carolina State Highway Dept.....Raleigh, N.C.
 Institute of Paper Chemistry.....Appleton, Wis.
 North Dakota Agricultural College.....Fargo, N.D.
 Penn State Bureau of Standards.....Harrisburg, Pa.
 Purdue University.....Lafayette, Ind.
 Southern Research Institute*.....Birmingham, Ala.
 Texas State Highway Dept.....Austin, Tex.

TEXTILES

Atlantic Rayon Corp.*.....Lowell, Mass.
 Belding Heminway Corticelli.....Putnam, Conn.
 Better Finishes & Coatings Inc.*..Somerville, N.J.
 Buckeye Fabric Finishing Co.*.....Coshocton, Ohio.
 Fairforest Finishing Co.*.....Spartanburg, S.C.
 Gregg Dyeing Div.*.....Graniteville, S.C.
 International Braid Co.....Providence, R.I.
 Ludlow Mfg. & Sales Co.....Ludlow, Mass.
 North American Rayon.....Port Arthur, Tenn.
 Pacific Mills*.....Newark, N.J.
 Pacific Mills.....Lyman, S.C.
 Southbridge Finishing Co.....Southbridge, Mass.
 U.S. Finishing Co.....Providence, R.I.
 Ververay Corp.*.....New York, N.Y.

U. S. GOVERNMENT

Eastern Regional Research Labs.*.....Wyndomoor, Pa.
 Forrest Products Labs.....Madison, Wis.
 National Bureau of Standards.(16)*.Washington, D.C.
 Bureau of Reclamation.....Denver, Colo.
 Public Roads Administration.....Arlington, Va.
 U.S.M.C. Depot of Supplies*.....Philadelphia, Pa.
 U.S. Navy*.....Washington, D.C.
 U.S. Naval Clothing Depot*.....Brooklyn, N.Y.
 U.S. Naval Materials Lab.....Brooklyn, N.Y.

U.S. Navy Yard.....Mare Island, Calif.
 U.S. Naval Aircraft Factory.....Philadelphia, Pa.
 U.S. Navy Yard.....Philadelphia, Pa.
 U.S. Naval Hospital*.....Bethesda, Md.
 AAF Wright Field (4).....Dayton, Ohio.
 Rock Island Arsenal.(2)*.....Rock Island, Ill.
 Edgewood Arsenal.....Edgewood, Md.
 Raritan Arsenal.....Melechen, N.J.
 Engineer Board (2)*.....Fort Belvoir, Va.
 Ft. Monmouth Signal Lab.(3)*...Little Silver, N.J.
 Jeffersonville CM Depot.(4)*...Jeffersonville, Ind.
 Philadelphia CM Depot (2)*.....Philadelphia, Pa.
 Port of New York Authority.....Jersey City, N.J.

UTILITIES, WIRE AND CABLE

American Steel & Wire Co.....Cleveland, Ohio.
 American Steel & Wire Co.*.....Worcester, Mass.
 American Wire Fabrics Corp.*.....Mount Wolf, Pa.
 Anaconda Wire & Cable Co..Hastings-on-Hudson, N.Y.
 Anaconda Wire & Cable Co.....Sycamore, Ill.
 Bell Telephone Labs.....Murray Hill, N.J.
 Bell Telephone Labs.(3)*.....New York, N.Y.
 Boston Edison Co.....Boston, Mass.
 Collyer Insulated Wire Co.*.....Pawtucket, R.I.
 Consolidated Gas & Electric.....Baltimore, Md.
 Detroit Edison Co.....Detroit, Mich.
 General Cable Corp.*.....Bayonne, N.J.
 Kennicott Wire & Cable Co.....Bridgeport, Conn.
 Kennicott Wire & Cable Co.....Phillipsdale, R.I.
 Los Angeles Dept.of Water and Power.(3)....,Calif.
 Los Angeles Bur. of Standards...Los Angeles,Calif.
 Board of Transportation.....New York, N.Y.
 N.Y. & Queens Elec. & Power Co.....Flushing, N.Y.
 Northern States Power Co.....Minneapolis, Min.
 Okonite Co.....Dundee, N.J.
 Seneca Wire & Mfg. Co.....Prestoria, Ohio.

ATLAS 'OMETERS IN OTHER COUNTRIES

ARGENTINA*
 AUSTRALIA*
 AUSTRIA
 BELGIAN KONGO
 BELGIUM*
 BRAZIL
 CANADA*
 CHILE
 COLOMBIA
 CUBA
 CZECHOSLOVAKIA
 DENMARK*
 EGYPT
 ENGLAND*
 FINLAND
 FRANCE*

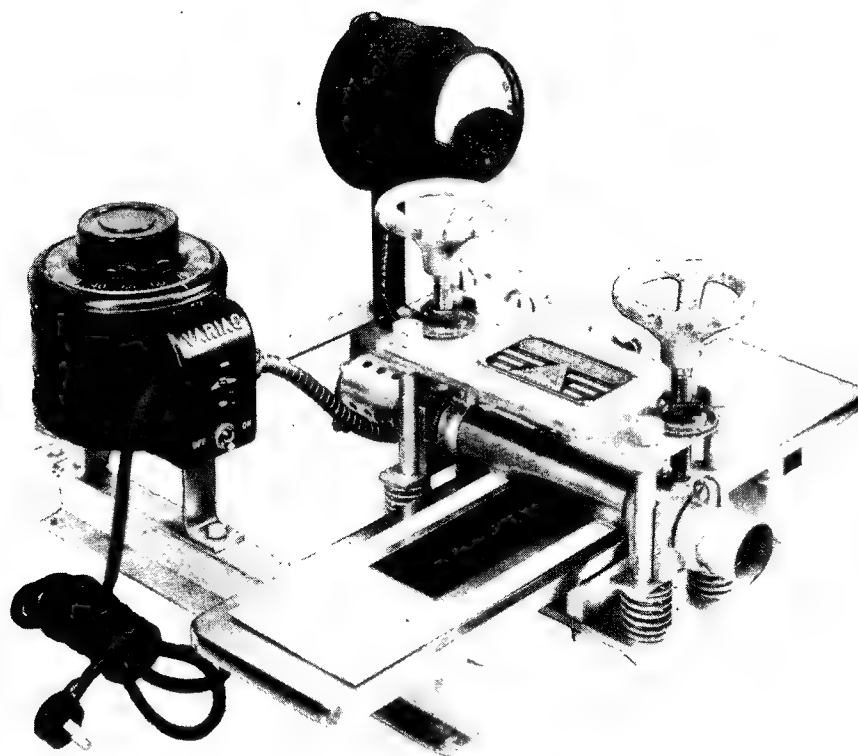
GERMANY
 GREECE
 GUATEMALA
 HAWAII
 HUNGARY*
 INDIA
 IRELAND
 ISRAEL*
 ITALY*
 JAPAN
 JAVA
 MEXICO
 NETHERLANDS
 NEW ZEALAND*
 NORTHERN IRELAND
 NORWAY*

PAKISTAN
 PANAMA CANAL ZONE
 PHILLIPINE ISLANDS*
 POLAND
 PORTUGAL
 SCOTLAND*
 SOUTH AFRICA*
 SPAIN
 SWEDEN*
 SWITZERLAND
 TRINIDAD
 URUGUAY*
 U.S.S.R.*
 VENEZUELA
 YUGOSLAVIA

*Indicates Twin-Arc Weather-Ometers
 Figures in parenthesis show number of machines at that location.

TYPE OGS-48

ASPHALT TRIMMER



Films of asphalt or other bituminous materials of a uniform thickness applied under controlled conditions of temperature are a requisite to dependable test results in either Weather-Ometer (accelerated weathering) or actual out-door tests.

The Atlas Asphalt Trimmer is a convenient and dependable instrument with which the average operator can with ordinary care produce films of a uniform thickness within a tolerance of ± 0.001 ".

The doctor bar under which the coated panel is passed is an electrically heated machined stainless steel tube which may be raised and lowered vertically to control the thickness of the film. A variable voltage transformer is employed to regulate the doctor bar temperature which is measured by an indicating pyrometer. The table or plate on which the panels are passed under the doctor bar is level and fixed and is heated to prevent chilling of the coating material prior to and during the trimming operation.

The Asphalt Trimmer comes complete with switches and pilot lights for both the doctor bar and plate and a cord for connection to a lighting circuit of 110-120 volts or a power circuit of 208-250 volts 50-60 Cy. A.C.

Sole Manufacturers

ATLAS ELECTRIC DEVICES CO.

361 W. Superior St.

Chicago 10, Illinois

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

No. 121548

4114 N. Ravenswood Ave., Chicago 13, Ill., U. S. A.

WEATHER-OMETEREXPORT PRICE LIST F.A.S. ATLANTIC AND GULF PORTS OF EXIT ONLY

ADD 2% WHEN (U.S. Pacific Ports are selected. All Prices in U.S. Dollars

		<u>A L T E R N A T I N G C U R R E N T</u>			<u>DIRECT CURRENT</u>	
		<u>208</u>	<u>to</u>	<u>250</u>	<u>Volts</u>	<u>220-250 Volts</u>
		<u>60 Cycle</u>		<u>50 Cycle</u>		<u>25-30 Cycle</u>
<u>ENCLOSED MODELS:</u>		<u>One Year Supply included:-</u>				
Twin Arc	DLTS-X	\$3083.00		\$3179.00		\$3215.00
Twin Arc	HVDL-X	3556.00		3653.00		3689.00
Single Arc	SL-TS	2599.00		2684.00		2745.00
<u>OPEN MODEL:</u>						
Single Arc	BWM-CC	1533.00		1630.00		1655.00
<u>ENCLOSED MODELS:</u>		<u>Two Years Supply included:-</u>				
Twin Arc	DLTS-X	3423.00		3539.00		3575.00
Twin Arc	HVDL-X	3916.00		4013.00		4052.00
Single Arc	SL-TS	2828.00		2913.00		2974.00
<u>OPEN MODEL:</u>						
Single Arc	BWM-CC	1893.00		1990.00		2015.00

ASPHALT TRIMMER OGS 48 with VARIAC and PYROMETER, 115 Volts 10 Ampere
50/60 Cycle including one year supplies \$320.00
or including two year supplies \$341.00

WIRE SPECIMEN DRUM BCS \$175.00 for all models (our regular domestic price)
(Used for various rope sizes also.)

SPECIAL MODEL WEATHER-OMETERS - ON APPLICATION

THE ATLAS CIRCULATING SYSTEM provides a means of circulating distilled or filtered water when the available tap water is not suitable for the Weather-Ometer Sprayed. Supplied complete with Pump, Tank, Motor, Pressure Regulator, and supplies, with Two (2) Galvanized Tanks, 12"x36" (30 cm x 91 cm) 14 Gallon (3.8 Litre) Capacity, \$400.00; with Monel Tanks \$500.00. For De-Ionized systems, \$600.00.

FREEZING CABINETS while not mentioned in our catalog, will be available, in Temperature ranges of Minus 50° F (45° C) to Minus 10° F (23° C), and within a price range from \$2195.00 to \$4575.00.

SOLE MANUFACTURERS

ATLAS ELECTRIC DEVICES CO.
361 W. Superior Street, Chicago 10, Ill.
U. S. A.

Export Boxing included in the price

EXPORT - WEATHER-OMETER ORDERING DATAELECTRICAL REQUIREMENTSALTERNATING CURRENT: Single Phase. Specify frequency when placing order.

Weather-Ometers operate on any two wires, or one phase, of a supply circuit having the proper voltage, viz., 208 to 250 volts, regardless of whether it is a single phase, 2 phase, or 3 phase system.

VOLTAGE: 208 to 250 volts. Specify exact voltage when placing order.STARTING CURRENT:

For first 10 minutes

Single arc models

25 amps.

Twin arc models

50 amps.

RUNNING CURRENT:

15-17 amps.

30-34 amps.

POWER CONSUMPTION (approx.)

2.5 kw.

5 kw.

BOOSTER TRANSFORMER: Required if line voltage is between 187 and 207 Volts.LINE TRANSFORMER: Required for other voltages such as 115, 380, 460, 575, or similar voltage.PLEASE SPECIFY IF WE ARE TO SUPPLY TRANSFORMER. See prices on separate sheet.DIRECT CURRENT: 220 to 250 volts. Power consumption slightly higher than on A.C. Transformers are not used on Direct Current.RUNNING WATER REQUIREMENTS:

	<u>U. S. standard</u>	<u>Metric</u>
Inlet	3/8" Pipe	1.7 cm. Pipe O.D.
Outlet	1-1/4" Pipe	4.2 cm. Pipe O.D.
Water per hour,		
variable	0-90 Gallons	variable 0-340 litres
Water pressure 20 to 100	P.S.I.	1.5 to 7.0 kg.per sq.cm.
The Weather-Ometer will pass thru a door 36 inches (92 cm) wide, 77 inches (195 cm) high.		

If running water is not available, we can supply a Circulating System. (See Price List.) Pressure Regulator with Gage, and Strainer is furnished on all Weather-Ometers.

SUPPLIES & ACCESSORIES: Quoted Weather-Ometer prices include supplies and miscellaneous accessories for one or two years continuous operation of the Weather-Ometer ordered.FOR 7200 HOURS (1 YEAR)14400 HOURS (2 YEARS)

<u>ITEM</u>	<u>BWM-C</u>	<u>SL-TS</u>	<u>DLTS-X</u>	<u>HVDL-X</u>	<u>BWM-C</u>	<u>SL-TS</u>	<u>DLTS-X</u>	<u>HVDL-X</u>
Electrodes	300	300	600	600	600	600	1200	1200
Globes	6	6	12	12	12	12	24	24
Panels	200	200	200	200	400	400	400	400

SPECIMEN HOLDERS

Vertical	32	32	32	32	32	32	32	32
Horizontal	0	0	0	15	0	0	0	15

Dollar Value of
Spare Parts & Ac-

cessories, Approx. \$140.00 \$254.00 \$368.00 \$380.00 \$218.00 \$393.00 \$498.00 \$510.00

THE FOLLOWING INFORMATION IS REQUIRED WITH YOUR ORDER:-

Voltage available at machine location _____ Volts.

Alternating, or Direct Current _____ Current.

If alternating current, what frequency _____ Cycles.

Thermometer and Thermo-Regulator F° or C° _____ °.

Transformer voltage if Atlas is to supply _____.

ATLAS ELECTRIC DEVICES CO.

361 W. Superior St., Chicago 10, Ill., U.S.A.

WEATHER-OMETER SHIPPING DATA ---

EXPORT

Prices of all Weather-Ometers are quoted F.A.S. Atlantic and Gulf Ports of exit only. If U. S. Pacific ports are selected, add 2% to the published prices.

The following items of expense must be considered in addition to our published prices:- Ocean Freight, Marine insurance, all risks; storage, if any; and consular fees, if any. These will be contracted for by us as shipper, and charged to the purchaser at the prevailing rates at date of sailing, if desired.

It is understood and agreed that the vendor shall not be liable for delay in or non-performance of any obligation hereunder, including delivery of any goods or merchandise, if such delay or non-performance occurs by reason of any condition beyond vendor's control and for which he is not responsible, including strikes, fire, flood, Acts of God, riot, or action of any government authority, domestic or foreign.

We furnish below the approximate weights and measurements of shipments of the various Weather-Ometer models to enable the purchaser to ascertain the approximate costs, in addition to the published F.A.S. prices:

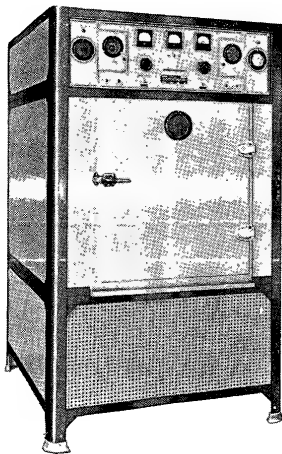
<u>WEATHER-OMETER MODEL</u>		<u>SUPPLIES</u>	<u>GROSS WEIGHT</u>		<u>NET WEIGHT</u>		<u>MEASUREMENTS</u>	
		<u>For</u>	<u>Pounds</u>	<u>- Kilos</u>	<u>Pounds</u>	<u>- Kilos</u>	<u>Cu.Ft.</u>	<u>Cu. Meters</u>
Twin Arc,	DLTS-X	1 Year	1880	853	1350	.612	144	4.03
Twin Arc,	DLTS-X	2 Years	1980	898	1450	.658	150	4.24
Twin Arc,	HVDL-X	1 Year	1930	875	1400	.638	144	4.03
Twin Arc,	HVDL-X	2 Years	2030	921	1500	.680	150	4.24
Single Arc,	SL-TS	1 Year	1366	620	1000	.453	150	4.24
Single Arc,	SL-TS	2 Years	1795	814	1090	.494	152	4.29
Single Arc,	BWM-CC	1 Year	926	420	562	.255	109	3.05
Single Arc,	BWM-CC	2 Years	1180	535	745	.338	138	4.05
Circulating System			605	275	405	.184	56	1.6

ATLAS ELECTRIC DEVICES CO.

361 W. Superior St.,
Chicago 10, Illinois
U.S.A.

THE ATLAS O-METER TRI-O

STANDARD LABORATORY INSTRUMENTS OF THE WORLD FOR DETERMINING DURABILITY AND PERFORMANCE



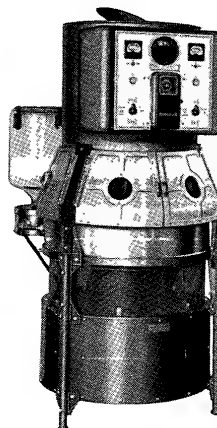
WEATHER-OMETER®

The Weather-Ometer is a laboratory apparatus for ascertaining at a greatly accelerated speed the trend of reactions which will occur on all types of products in outdoor exposures.

It is a self-contained machine, employing the three principal weathering agents, Synthetic Sunlight, Moisture and Temperature Changes.

Automatic control, regulation and application of these weathering agents make it possible to establish standard test conditions which can be duplicated and reproduced at any time or place.

The need for such equipment is evident since in addition to the extensive time required to obtain results from exposures to actual weather, the resultant tests will vary greatly not only from location to location but from day to day, month to month, and year to year at the same location.

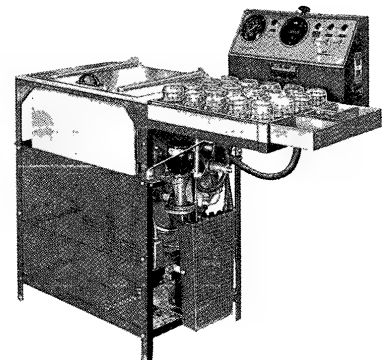


FADE-OMETER®

The Fade-Ometer is a patented self-contained electrically operated device for determining by accelerated tests in the laboratory the action of sunlight on all materials.

The need for such equipment is evident in every industry having products which fade or otherwise deteriorate from the action of the sun. Natural sunlight, available only part of a 24 hour day at best, and frequently not at all, is never constant due to the difference in latitude, season of year, time of day and local climatic conditions.

The Enclosed Violet Carbon Arc, source of radiant energy, provides noon June sunlight 24 hours per day. The Fade-Ometer provides constant, uniform and reproducible conditions regardless of time or place, thus speeding up research and production and insuring quality of product.



LAUNDER-OMETER®

The Launder-Ometer is the standard laboratory washing machine of the American Association of Textile Chemists and Colorists and is used throughout the world for quickly determining the colorfastness of textiles to commercial laundering and domestic washing.

From one to twenty samples may be tested simultaneously under controlled conditions of temperature and mechanical action.

Available with either one-pint glass jars for the standard tests or with metal containers for the accelerated washfastness tests.

All Launder-Ometers have full automatic control with a choice of electricity, gas or steam for heating the water bath. The Preheating and Loading Table is an indispensable accessory for added efficiency and reduction of operator time.

Write for complete catalogs describing each machine.

Accelerotor®

Wet and Dry Abrasion Tests

Sole Manufacturers

ATLAS ELECTRIC DEVICES COMPANY

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

Scorch Tester

Chlorine Retention Testing

ATLAS ELECTRIC DEVICES CO.
CHICAGO 10, ILLINOIS
U. S. A.

UNCLASSIFIED

INSTALLATION INSTRUCTIONS

for

WEATHER-OMETER

Type H.V.D.L.

Serial No. 440

Voltage 230

Cycles 50



25X1A

Sole Manufacturers
ATLAS ELECTRIC DEVICES CO.
INCORPORATED
CHICAGO 10, ILLINOIS, U. S. A.

UNCLASSIFIED

FADE-OMETER

WEATHER-OMETER

LAUNDER-OMETER

HI-LO

CABINETS

HI-HUMIDITY

ELECTRIC REQUIREMENTS

CURRENT 208-245 VOLTS, AC. or D.C.
AMP.

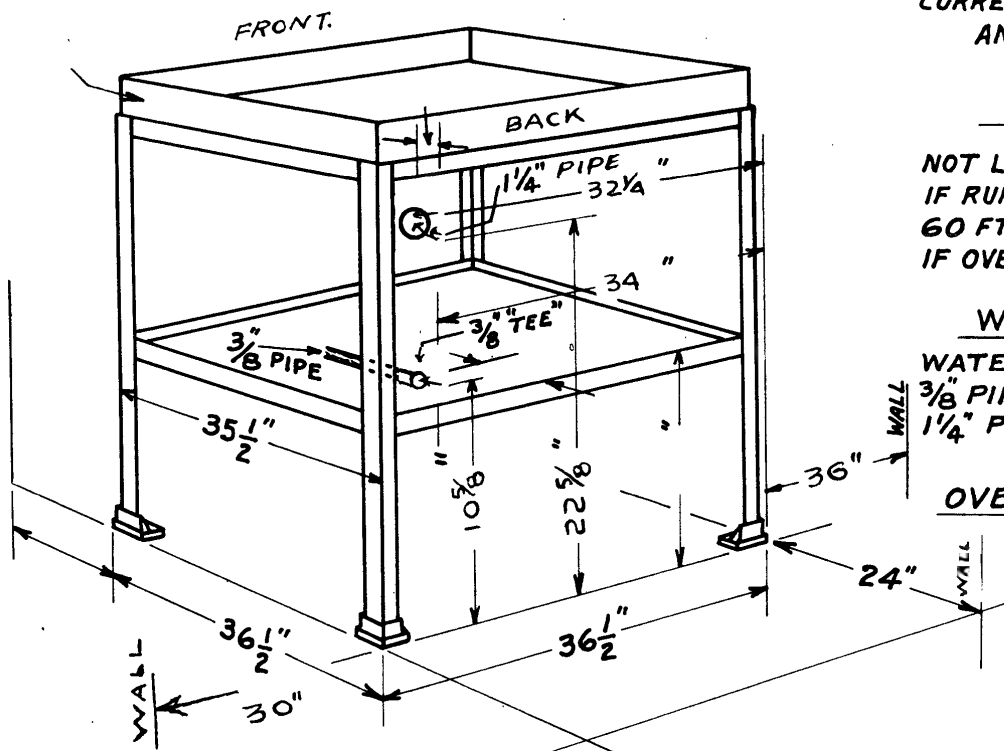
CONDUCTOR SIZE

NOT LESS THAN NO. 8 B. & S. GA.
IF RUN TO SERVICE IS OVER
60 FT. USE NO. 8.
IF OVER 120 FT. USE NO. 6.

WATER CONNECTIONS

WATER PRESSURE 15-30 LBS..
 $\frac{3}{8}$ " PIPE TO MAINS.
 $\frac{1}{4}$ " PIPE TO DRAINS.

OVERALL HEIGHT 78"



CAUTION:-

DO NOT PLACE MACHINE
CLOSER THAN 2 FT.
FROM ANY WALL.

TYPE DL-TS.

ADVANCE INSTRUCTIONS FOR WEATHER-OMETER

ATLAS ELECTRIC DEVICES CO.
CHICAGO, ILL.

DRAWN	CHK'D	DATE	DRAWING NO.
BY		7-1-42	13-150-42

UNPACKING

This Weather-Ometer, with accessories and supplies to last years, is contained in -1- box. All loose and unattached parts are wrapped separately, each bearing a label identifying the contents and quantity. Suggest that all small packages and boxes be removed from box before attempting to move the Machine.

LOCATION

The Weather-Ometer should be located in a well-ventilated room and should be placed at least 2 feet (62 c.m.) from any wall. The proper locating of the Machine will be appreciated by the person whose duty it will be to attend it.

SIZE OF ELECTRICAL CONDUCTORS

The Weather-Ometer draws approx. 40 amperes when warm and 50 to 60 amperes when first starting up. We suggest the following:

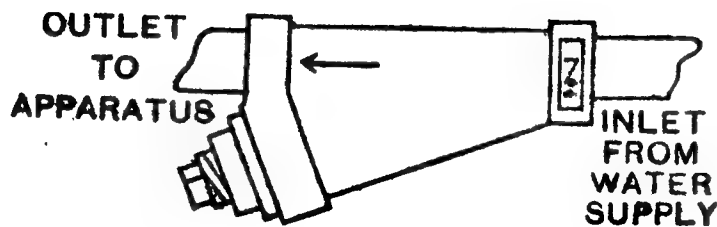
- 1 - A fused wall switch, 60 amperes, within sight of Machine.
- 2 - Conductors from wall switch to main power lines of sufficient capacity to carry the maximum current without an appreciable drop in Voltage.
- 3 - Voltage at Weather-Ometer should be constant but may be from 208 to 240 Volts.
- 4 - Reactance Coils (see wiring diagram) are provided with terminals or taps to take care of this wide range of supplied Voltages.

SECONDARY FUSES

Within the lower part of the Control Cabinet are located fuses for each Arc Lamp and Motor Circuit. (Cover to low position is hinged and screw shut).

SCREEN FILTER UNIT FOR
SPRAY LINE WEATHER-OMETER


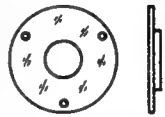

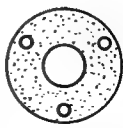


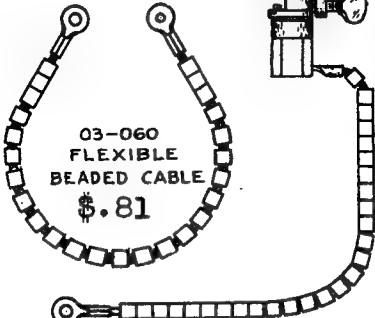

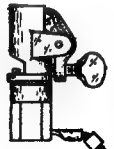
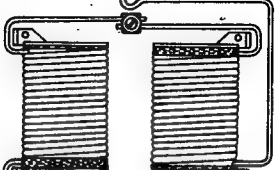
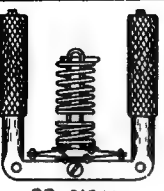
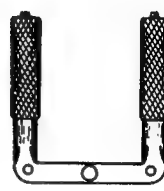


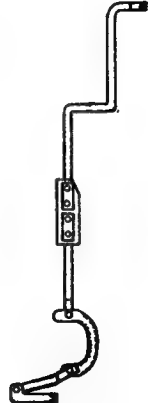





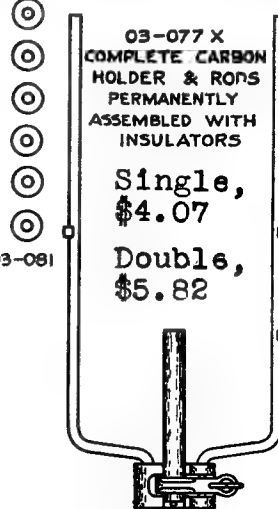

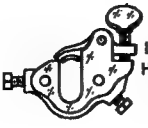
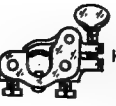
1. This filter is to be connected to the 3/8" (c.m.) pipe projecting from the rear of the machine. See Print #13-150-42.
2. The "outlet" end of this filter connects to short brass pipe. An arrow indicates the direction of flow.
3. In time the screen may need cleaning. Remove the lower nut cap at the bottom and the tubular screen can be easily removed and cleaned.
4. Replace screen tube in the same position and replace nut cap tightly.



PARTS LIST

ATLAS ENCLOSED ARC REFERENCE CHART

TO BE HANDED TO THE PERSON IN CHARGE OF FADE-OMETER OR WEATHER-OMETER
No. _____ IN YOUR LABORATORY. VOLTS _____ CURRENT _____ TYPE _____

<p>03-086X GAS CHAMBER COMPLETE INCLUDES THESE 4 ITEMS & SCREWS \$4.72</p>  <p>03-086 GAS CHAMBER \$2.50</p>  <p>03-085 FEED FLOOR, METAL \$1.26</p>  <p>03-088 LAVA CARBON GUIDE \$0.51</p>  <p>03-085B LAVA FEED FLOOR \$0.45</p>  <p>03-075 SLIDE ROD SPRING (PAIR) \$0.18</p>	<p>A.C. ONLY-03-937L D.C. ONLY-03-053 UPPER CARBON HOLDER ONLY INCLUDING SCREWS, CONNECTION PLATE, AND PAD \$2.23</p>  <p>03-060 FLEXIBLE BEADED CABLE \$0.81</p>  <p>03-055 PORCELAIN SLIDE \$0.71</p> 	<p>A.C. ONLY-03-937LX D.C. ONLY-03-053X UPPER CARBON HOLDER COMPLETE \$3.75</p> 	 <p>03-044 X SOLENOIDS PAIR \$16.00</p>  <p>03-018 X ARMATURE COMPLETE WITH WAGON SPRING \$11.62</p>  <p>03-018 LAMINATED ARMATURE ONLY \$8.30</p>  <p>03-028 X WAGON SPRING COMPLETE \$3.32</p>
 <p>03-031 LIFTING LINK ONLY \$3.11</p>  <p>03-039 X CLUTCH WITH LINK COMPLETE \$5.71</p>  <p>03-082 DASH POT \$6.35</p>  <p>03-039 CLUTCH ONLY \$2.60</p>  <p>03-955 FLEXIBLE BALL & SOCKET JOINT \$1.25</p>  <p>03-082 X DASH POT COMPLETE WITH FLEXIBLE BALL & SOCKET JOINT \$7.60</p>  <p>03-073 SLIDE ROD (PAIR) \$2.70</p>			<p>03-077--Lower Carbon Holder Rods, Pair \$1.45</p>  <p>03-077 X COMPLETE CARBON HOLDER & RODS PERMANENTLY ASSEMBLED WITH INSULATORS Single, \$4.07 Double, \$5.82</p>  <p>03-081 12 CARBON HOLDER ROD INSU- LATORS (LAVA) \$0.52</p> <p style="text-align: center;">SPECIFY SINGLE OR DOUBLE CARBON HOLDER</p>
 <p>03-078 L 2 LOWER CARBON HOLDER-DOUBLE 2-CARBONS \$3.85</p>  <p>03-078 L 5 LOWER CARBON HOLDER-SINGLE 1-CARBON \$2.10</p>			

CERTIFICATION

We certify the prices shown are not in excess of maximum prices permitted by the Office of Price Administration.

ATLAS ELECTRIC DEVICES CO.
361 W. Superior St.
Chicago, Ill.

--Immediate Shipment--
All Prices F.O.B. Chicago.

Printed in U.S.A.

E.C. PARTS & PRICES 10142 FOR
1/2"x12" ENCLOSED OMETER ARC

WATER CIRCUIT

The Weather-Ometer should be supplied with clean, cool water, free from grit (sand), (fit to drink is the non-technical way of expressing). The following points should be followed:

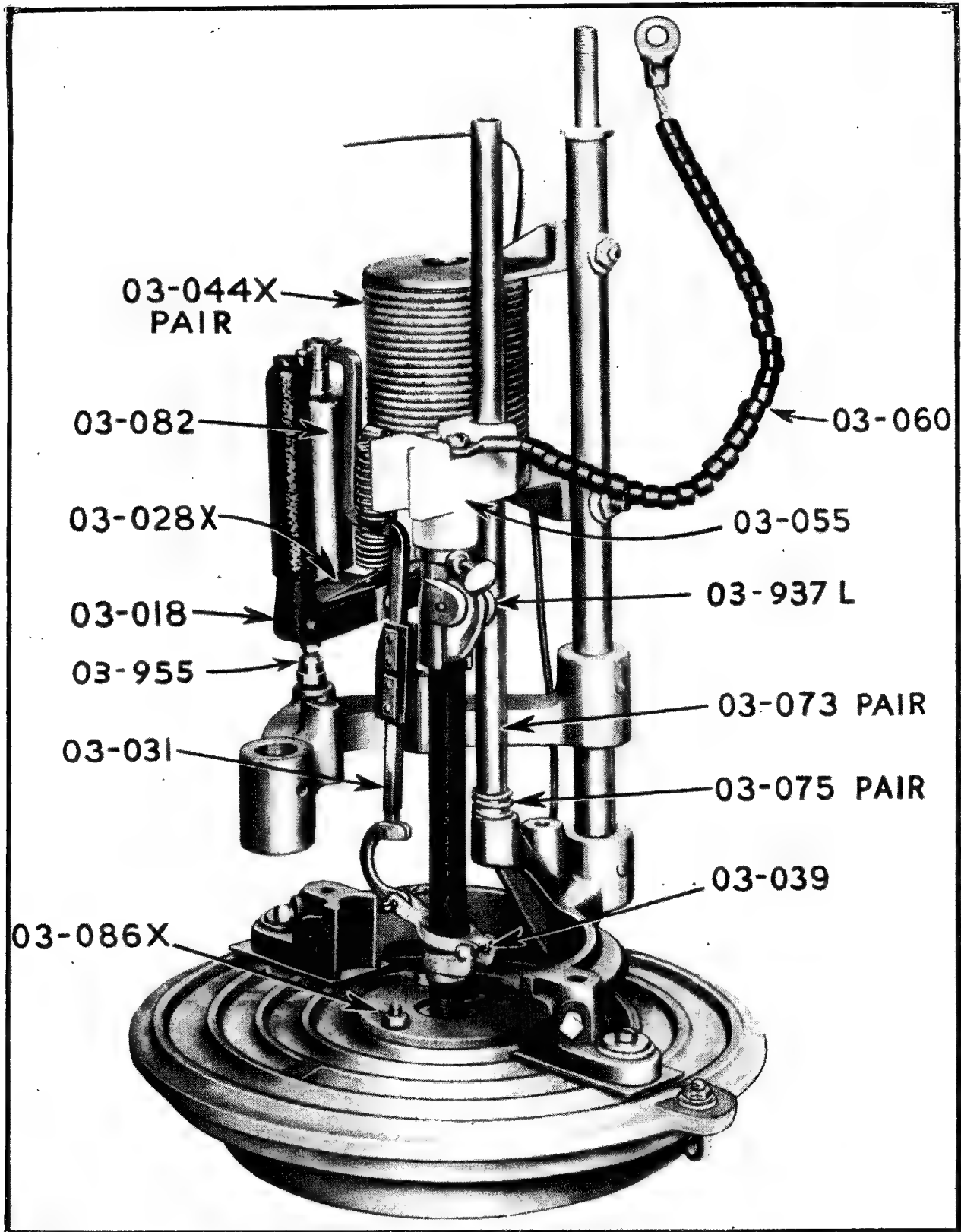
- 1 - Supply pipe not less than 3/8 inch (1 c.m.) diameter.
- 2 - Drain or discharge (free and unobstructed) not less than 1 1/4 inches (3.5 c.m.) diameter.
- 3 - Water pressure 20 to 78 pounds per sq.inch.
- 4 - Valves in the water line, other than those furnished with the machine, should be sealed to prevent an unauthorized person from shutting off the water during a test.
- 5 - Install screen filter in supply line (see packing list).
- 6 - Install pressure regulator in supply line, if water pressure is too high or fluctuates.

NOTE: Water will only flow through the magnetic valves when the machine is in operation.

LEVELING THE WEATHER-OMETER

If the machine is not leveled up, the doors will not close properly and the water in the sump or reservoir will not drain. A few liters of water in the sump is a simple method of leveling the machine.

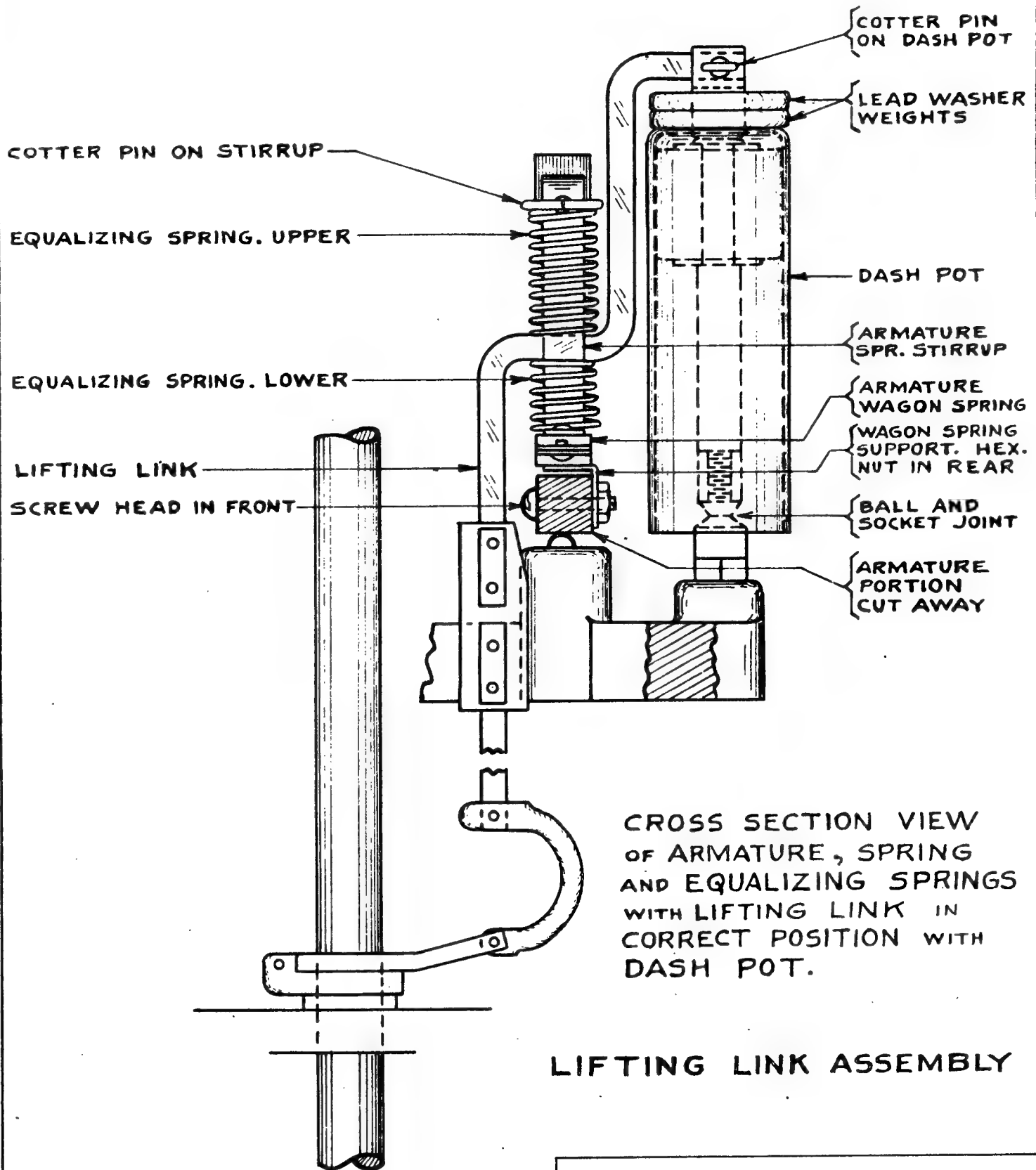
ATLAS ENCLOSED ARC ASSEMBLY



ATLAS ELECTRIC DEVICES CO.

361 W. SUPERIOR ST CHICAGO

ENC. ARC
11640



LIFTING LINK ASSEMBLY

ATLAS ELECTRIC DEVICES CO.
CHICAGO, ILLINOIS U. S. A.

DRAWN	CHECKED	DATE	SHEET NO.
W. S.		1-31-38	L. L. A. 13138

INSTALLATION INSTRUCTIONS

THESE INSTRUCTIONS REFER TO THE INSTALLATION OF THE NEW LAVA TYPE GAS CHAMBER AND FEED FLOOR USED ON ALL ATLAS ENCLOSED ARC LAMPS.

FIRST - SEE PRINT NO. FO-1028

REMOVING OLD GAS CHAMBER

The burnt out or defective gas chamber can easily be removed by shearing off the heads of the three screws with a sharp cold chisel. These screw heads are found on the under side of the gas chamber. After these have been sheared off, strike the burnt out casting a few sharp blows and it will drop off. Next remove the upper casting or feed floor.

NEW LAVA TYPE GAS CHAMBER AND FEED FLOOR

This consists of four pieces. First, the lower casting, #03-086, which is similar to the old gas chamber. Second, the lava bushing, #03-088. Third, the feed floor which is also a casting. Fourth, the lava washer.

These two castings with lava bushing are assembled in the same manner as the old type, with the exception that, after the three screws are tightened up, the lava washer is laid on top of the feed floor. You will note that two of the screws are about one-fourth of an inch longer. They should pass through the lava washer, one in front and one to the right, facing the carbon holder. The shorter screw should be placed in back. This screw does not pass all the way through the lava washer. If it did, there would be danger of short-circuiting on the carbon clutch that comes in close proximity.

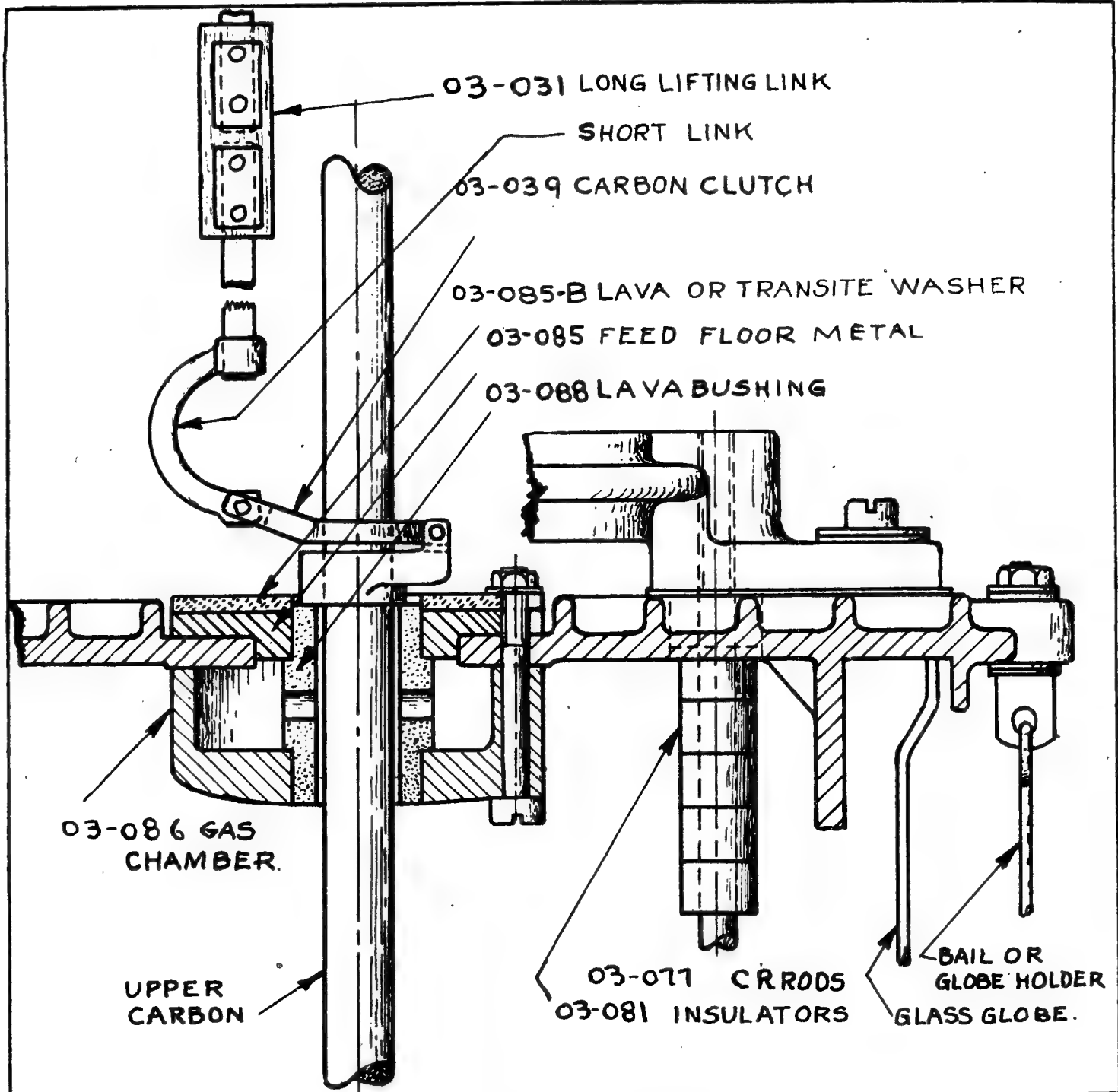
When all the screws and nuts are tightened up, one should be able to turn the lava bushing, #03-088, slightly. If it is fitted too tight, it will crack, due to the heat generated by the arc.

When these parts are assembled, you will note there is a small recess between the top of the lava washer and the lava bushing. This is designed on purpose, so as to allow the lower part of the clutch (#03-039) to drop down on top of the bushing when the arc feeds.

Should you have occasion to order additional set of gas chamber and feed floor, kindly mention No. 03-086X.

ATLAS ELECTRIC DEVICES CO., INC.
361 WEST SUPERIOR STREET, CHICAGO, ILL., U.S.A.

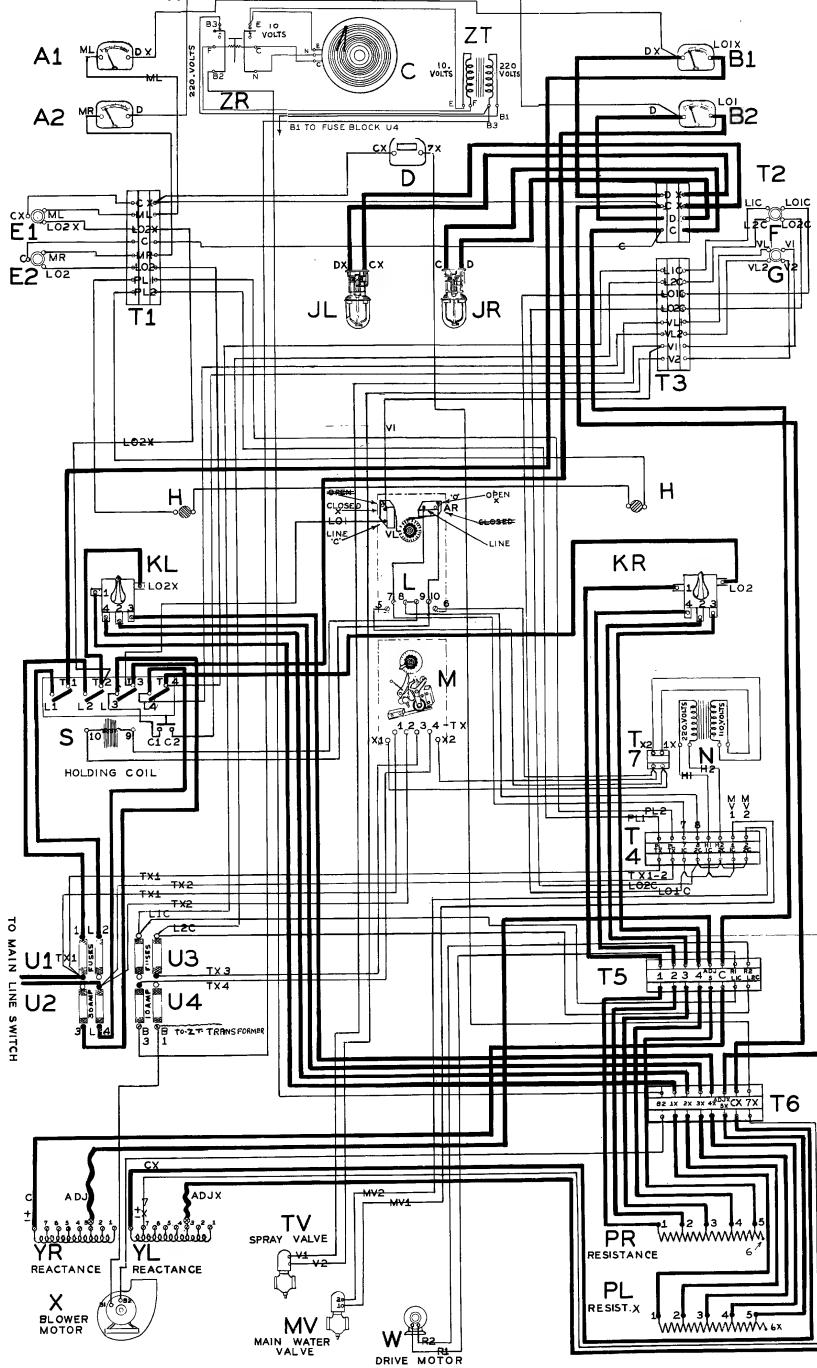
Gas Chamber 12-4-36



DETAIL SHOWING
CARBON CLUTCH AND
GAS CHAMBER
FOR
ENCLOSED ARC

ATLAS ELECTRIC DEVICES CO
CHICAGO ILLINOIS U.S.A.

DRAWN	CHECKED	DATE	SHEET NO
M.R.B.	C.W.J	9/6/34	FO. 1028



A1	VOLTMETER	LEFT ARC	W423
A2	VOLTMETER	RIGHT ARC	W423
B1	AMMETER	LEFT ARC	W424
B2	AMMETER	RIGHT ARC	W424
C	CONTROLLER RECORDER	CONNECTED BLOWER X	W426
D	RUNNING TIME METER	CONNECTED 7X VL	W441
E1	TOGGLE SWITCH	FOR A1 ARC/LINE	W442P
E2	TOGGLE SWITCH	FOR A2 ARC/LINE	W442P
F1	TOGGLE SWITCH	FOR L&S ON/OFF	W444P
F2	TOGGLE SWITCH	FOR TV ON/OFF	W444P
G	PILOT LIGHTS	POWER SUPPLY INDICATOR	W433
H	ARC LAMP	LEFT	W426R
JL	ARC LAMP	RIGHT	W426R
KL	4 PT. VOLTAGE ADJ. SW.	LEFT ARC	ED1151P
KR	4 PT. VOLTAGE ADJ. SW.	RIGHT ARC	ED1151P
L	CYCLE METER		W445
VL	ARC MICRO SWITCH	FOR ARC TIMING	W452
VR	WATER MICRO SWITCH	FOR TV SPRAY	W453
M	TIME SWITCH		W429
N	TRANSFORMER		W446
MV	MAIN WATER VALVE		W447M
TV	TIME WATER VALVE	SPRAY CYCLE	W447S
S	MAGNETIC SWITCH	FOR ARC LAMPS	4P DS448
T1	1-3-4-5-6	TERMINAL BLOCKS	W449
T2	TERMINAL BLOCK	ARC LAMP LINES	85299-4
T3	TERMINAL BLOCK	115V FOR L & M	85334-2
U1	FUSE	AMPS LEFT ARC	
U2	"	AMPS RIGHT ARC	
U3	"	FOR MV-N-S-W	
U4	"	AMPS FOR X	
PL	RESISTANCE	LEFT ARC X	W450-L
PR	RESISTANCE	RIGHT ARC	W450-R
W	DRIVE MOTOR	V. HP. RPM. SHAFT	
X	BLOWER MOTOR	V. HP. RPM. SHAFT	
Y	REACTANCE COIL	LEFT ARC	W451-L
YR	REACTANCE COIL	RIGHT ARC	W451-R
ZR	RELAY 10V COIL	230V CIRCUIT	
ZT	TRANSFORMER	230V/10V	

REACTANCE COILS

- 1-250 VOLTS
- 2-240 VOLTS
- 3-230 VOLTS
- 4-220 VOLTS
- 5-215 VOLTS
- 6-208 VOLTS
- 7-110 VOLTS

NO. 7X-VL IS 110 VOLTS FOR RUNNING TIME METER D

THIS MACHINE NO. _____
VL & YR CONNECTED TO
TERMINAL NO. _____
ADJ & ADJX TERMINALS ARE
FLEXIBLE AND MAY BE RE-
CONNECTED TO SUIT THE
PREVAILING VOLTAGE AT
MACHINE LOCATION.

WIRING DIAGRAM WEATHER-OMETER HV-DL-TWIN ARC

ATLAS ELECTRIC DEVICES CO.
CHICAGO ILL. U.S.A.

DRAWN	CHECKED	DATE	DD-CABLE	NO. WD
G.W.	W. J.	12-17-53	4PT. K.S.	
		DR. NO.	1-BLOCK	HV-DL
		5002	5-101841	12943

UNCLASSIFIED

OPERATING INSTRUCTIONS

for

WEATHER-OMETER

Type HV DL

Serial No. 440

Voltage 230

Cycles 50



Sole Manufacturers

ATLAS ELECTRIC DEVICES CO.

INCORPORATED

CHICAGO 10, ILLINOIS, U. S. A.

UNCLASSIFIED

FADE-OMETER

WEATHER-OMETER

LAUNDER-OMETER

HI-LO

CABINETS

HI-HUMIDITY

INSTALLATION AND OPERATING INSTRUCTIONS
FOR

TYPE _____

FOR TESTING _____

_____ CURRENT _____ CYCLES

LINE VOLTAGE _____ VOLTS

OMETER VOLTAGE _____ VOLTS

TRANSFORMER: PRIMARY _____ VOLTS SECONDARY _____ VOLTS

LINE CURRENT _____ AMPERES

OMETER CURRENT _____ AMPERES

OMETER SERIAL NO. _____

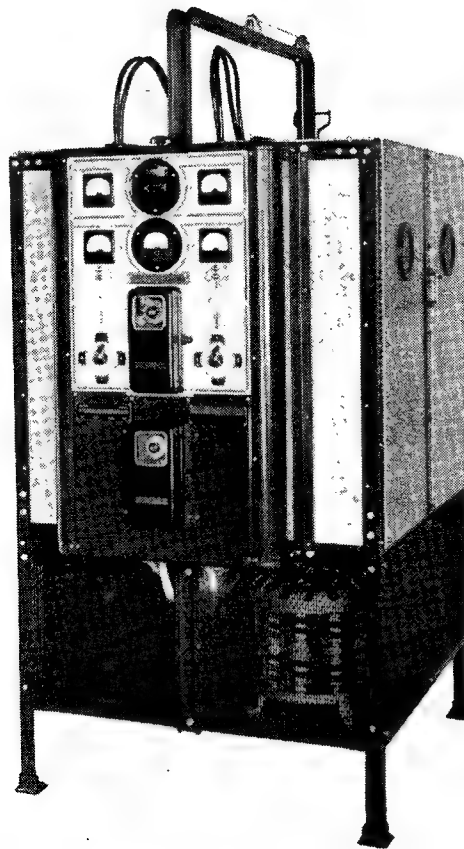
FOR _____

ATLAS ELECTRIC DEVICES CO., INC.
361 WEST SUPERIOR STREET, CHICAGO, ILLINOIS, U.S.A.

W.F.U. 434 1AD

THE WEATHER-OMETER

In this laboratory tool, the worker is provided with a light source equivalent to June Sunlight at noon, a mild or vigorous water spray, all enclosed within an insulated cabinet. The temperature within this chamber is automatically controlled by merely setting an indicating thermoregulator.



The purpose of this Machine is to predetermine (in advance) the effect of Sunlight, periodic rain and temperature changes on house paints, lacquers, enamels, bitumens, roofing and paving material, rope, cord, woven fabric, and many other commodities exposed to weathering conditions.

SPECIMEN DRUM

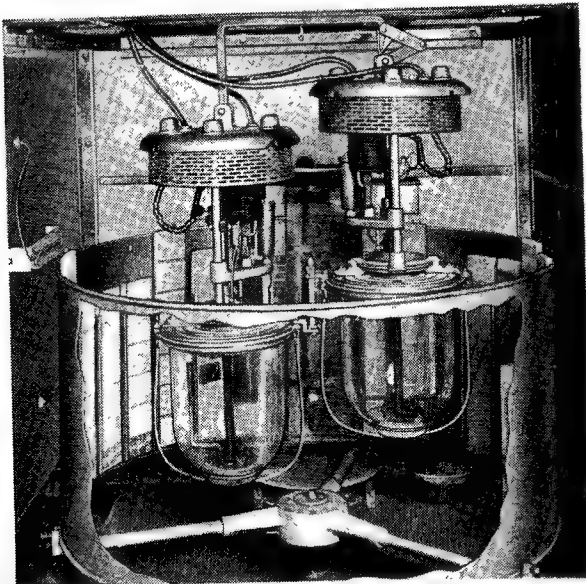
This Machine is designed to accommodate test samples in two positions.

- 1 ~ Vertical (paints, textiles, bitumens, etc.).
- 2 ~ Horizontal (material of low melting point).

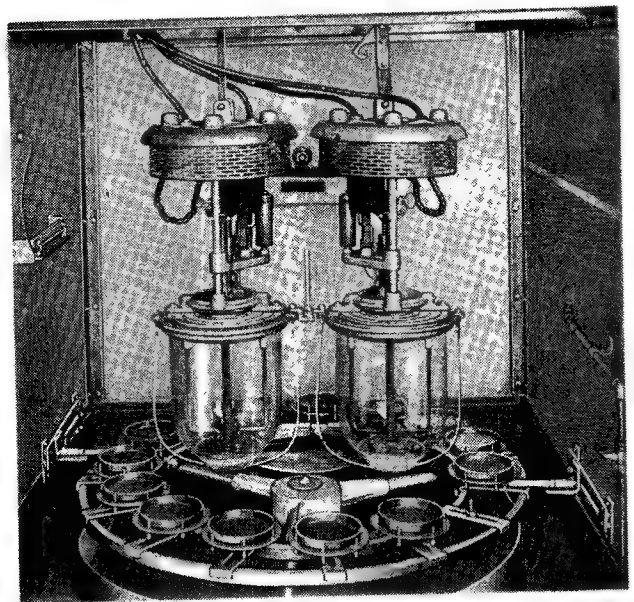
For Test "1" a Standard Weather-Ometer Drum or Cylinder is furnished.

For Test "2" a metal hoop or ring supporting 15 turntables, each in turn carrying a metal or glass dish or boat.

The illustration herewith is self-explanatory.



No.1 FOR VERTICAL TESTS.



No.2 FOR HORIZONTAL TESTS.

The Specimen Drum rests on a driven spider. This spider rotates by means of a suitable shaft, friction, gear reducer with motor and revolves at approximately 1 R.P.M.

The individual turntables supporting dishes or boats rotate once every three revolutions of the spider.

GENERAL INSTRUCTIONS

Weather-Ometer Tests are usually made on small specimen, cut to sizes that will conveniently fit into the drum slide or metal holder.

PREPARING WOODEN SPECIMEN:

- 1 - Select dry wood free from sap and knots, unless sap and knots are included in the study.
- 2 - The sharp edges should be sanded off and the surface smooth and free from dust before applying the first coat of paint.
- 3 - Apply a thin undercoat of paint and permit to dry at least 72 hours.
- 4 - Apply second coat of paint of proper film thickness and permit to dry at least 72 hours before placing in the Weather-Ometer or before applying an additional coat.
- 5 - All coats of paint should be applied to all sides and edges.

PREPARING METAL SAMPLES:

Cold rolled steel is usually used for test panels. These should be cut to fit into holders accompanying Machine.

- 1 - Free from rust spots,
- 2 - Sharp edges must be removed.
- 3 - Panels should be cleaned and free from grease, oil and finger prints.
- 4 - After cleaning, handle by edges only to eliminate finger prints which may cause rust marks.
- 5 - Apply first layer of coating to be tested and permit to dry.
- 6 - Apply second layer of coating and permit to dry before placing in Weather-Ometer.

When testing rope cords and textiles, such as cotton duck, tack or clamp fabric on red cedar frames provided.

CAUTION: Allow for shrinkage of material when fastening to wooden frame.

WATER CIRCUIT

The Weather-Ometer should be supplied with clean, cool water, free from grit (sand), (fit to drink is the non-technical way of expressing). The following points should be followed:

- 1 - Supply pipe not less than 3/8 inch (1 c.m.) diameter.
- 2 - Drain or discharge (free and unobstructed) not less than 1 1/4 inches (3.5 c.m.) diameter.
- 3 - Water pressure 20 to 78 pounds per sq.inch.
- 4 - Valves in the water line, other than those furnished with the machine, should be sealed to prevent an unauthorized person from shutting off the water during a test.
- 5 - Install screen filter in supply line (see packing list).
- 6 - Install pressure regulator in supply line, if water pressure is too high or fluctuates.

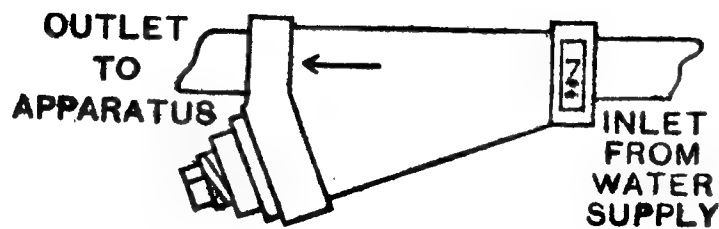
NOTE: Water will only flow through the magnetic valves when the machine is in operation.

LEVELING THE WEATHER-OMETER

If the machine is not leveled up, the doors will not close properly and the water in the sump or reservoir will not drain. A few liters of water in the sump is a simple method of leveling the machine.

SCREEN FILTER UNIT FOR
SPRAY LINE WEATHER-OMETER

1. This filter is to be connected to the 3/8" (c.m.) pipe projecting from the rear of the machine. See Print #13-150-42.
2. The "outlet" end of this filter connects to short brass pipe. An arrow indicates the direction of flow.
3. In time the screen may need cleaning. Remove the lower nut cap at the bottom and the tubular screen can be easily removed and cleaned.
4. Replace screen tube in the same position and replace nut cap tightly.



CYCLE TIME METER

This Meter automatically controls the light and water spray periods, and, before attempting to operate or set it, it is best to acquaint the attendant with its essential parts. Illustrated we show a Cycle Time Meter equipped with a 17-3 Cam. This Cam will automatically permit a mild spray to drench the specimen under test 3 minutes after every 17 minutes of light. The light will not be extinguished during the spray period.

TOP MICRO SWITCH.

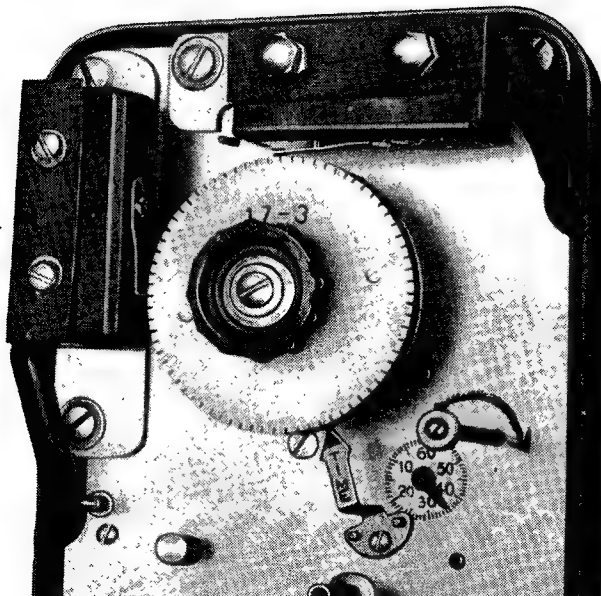
This Top Micro Switch, whose spring lever rides uninterrupted on the inner Cam, governs the arc circuit and will also influence the spray circuit, as will be explained later.

SIDE MICRO SWITCH.

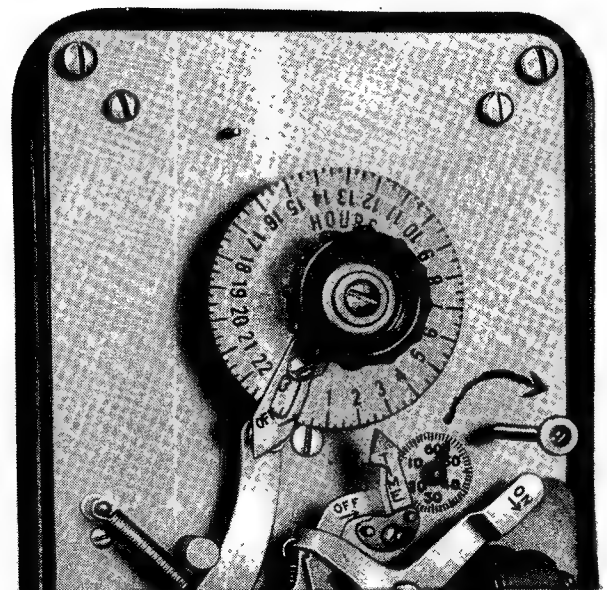
This Side Micro Switch is likewise equipped with a spring lever which rides upon an interrupted Cam, will produce a water spray on the sample every time the lever falls into a notch in the outer Cam. The notches on the 17-3 Cam are cut to produce a time interval of approx. 3 minutes.

CAMS IN GENERAL USE:

<u>CAM</u>	<u>LIGHT</u>	<u>SPRAY</u>	<u>USE</u>
17-3	continuous	3 min.out of 20 min.	Paint, varnish, lacquers, bitumens.
51-9	"	9 " " " 60 "	textiles, light rope or cords, rubber.

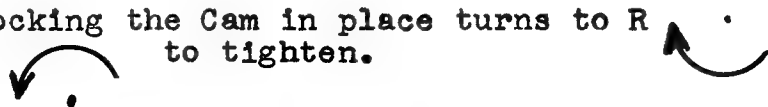


CYCLE TIME METER



AUTOMATIC SWITCH

REMOVING OR INSERTING A CYCLE CAM

- 1 - Note the number of washers or spacers used in front and back of the Cam. The number may vary with each Machine,
- 2 - The Plastic Knob locking the Cam in place turns to R to loosen and to L to tighten. 
- 3 - REMOVING CAM.
After removing Plastic Knob and washer, the Cam should slide out without any effort. DO NOT use any tools to remove Cam, nor is it wise to bend the lever spring on the Micro Switch. A firm hold of Cam with the hand will remove it.
- 4 - INSERTING CAM.
Hold Cam so that the number stamp on the face of the disc is facing the operator. Locate slot or keyway in Cam shaft and turn Cam so that the key in the bore of the Cam will be in line with the keyway in the shaft. Line up and push in place with the hand. The edge of the Cam will slide by the Micro Springs. Replace washer or washers and Plastic Knob, screwing same to the left until it is snug up to the face of the Cam.

ADJUSTING MICRO SWITCHES

These two switches are mounted on hinged bases, one screw acts as a hinge, the other as a lock.

The Micro Switches are adjusted and set at the factory, but, should the occasion arise that they need readjustment, the test is simple.

TO DETERMINE WHETHER MICRO SWITCHES ARE FUNCTIONING:

- 1 - Remove Plastic Knob and Cam.
- 2 - Close main line switch.
If switches are O.K., the following will happen:
 - 1- Arcs will be dead.
 - 2- Sample Spray will operate.
 - 3- Compress with finger the lever spring on "Top Micro Switch."
Result: Arcs will burn with sample spray still in operation.
 - 4- Compress with finger the lever spring on "Side Micro Switch," and at same time keep "Top Micro Switch" closed.
Result: Sample Spray will cease and Arc still burning.
 - 5- Release finger from "Top Micro Switch" but compress "Side Micro Switch"
Result: Arcs extinguish and sample spray in operation.
 - 6- Release both top & bottom Micro Switches.
Result: Arc extinguished and sample spray in operation.

- LIFE OF ELECTRODES -

A full load or trim of Electrodes should burn from 22 to 24 hours.

- SECOND LOAD OR TRIM -

Remove the upper electrode which is now 8 to 9 inches long and from it cut TWO 4-inch lengths (102 mm). Insert a new 12-inch electrode of the opposite kind (Cored or Solid) in the upper carbon holder and use the TWO 4-inch pieces in the lower holder.

Cutting the 4-inch lengths for the lower carbon holder from the upper electrode prevents waste of carbon.

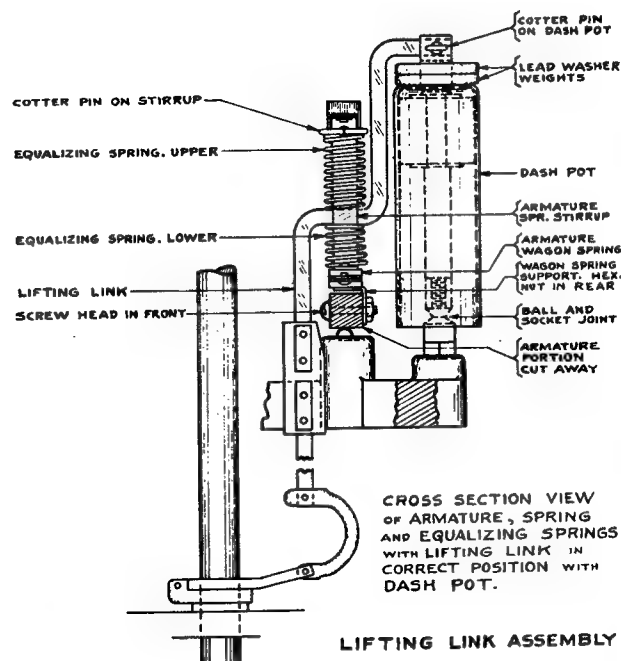
CAUTION: BOTH LOWER ELECTRODES MUST ALWAYS BE OF THE SAME KIND (CORED OR SOLID), NEVER MIXED, AND MUST BE OPPOSITE FROM THE KIND USED IN THE UPPER HOLDER OR THE LAMP WILL NOT OPERATE PROPERLY OR HAVE PROPER FADING QUALITY.



ARC LAMPS

1 TRIMMING OR LOADING ARC WITH CARBONS:

- 1 - The arc (alternating current) requires a Combination of Electrodes, Cored #20 and Solid #70. This Combination must always be adhered to. If a Cored upper is used, the lower carbon must be Solid. When a Solid upper is used, the lower Carbon must be Cored.
- 2 - Since the Arcs are always started with a full 12-inch (305 mm) electrode, you will note that, after burning 24 hours, the remains of the upper electrode is of sufficient length to be cut down to a 4-inch (102 mm) and then be used as a low electrode the next day, using full 12-inch (305 mm) electrode in the upper holder of the opposite type or kind. In this manner one 12-inch (305 mm) electrode is used for 24 hours in each lamp.
- 3 - The partly consumed electrodes may be cut into 4-inch (102 mm) lengths by inserting them in the "Cutter" (see packing list) - Electrode Receptacle and Cutter). Turn or rotate electrode against the saw blade, scoring same. The carbon can then be easily broken by hand at the scored point, 4-inches (102 mm).
- 4 - The lower carbon holder accommodates two 4-inch (102 mm) carbons of a like kind but opposite to the kind used in the upper holder.
- 5 - By using two carbons in the lower holder, it is possible to burn the Arcs over-night or 24 hours with a minimum amount of downward travel of the Arc (see cut).



TRIMMING ARC LAMPS
(Renewing Carbon Electrodes)

Wall Switch must be in "OFF" position.

Elevate Arcs by means of the locking lever located at the right side center of cabinet.

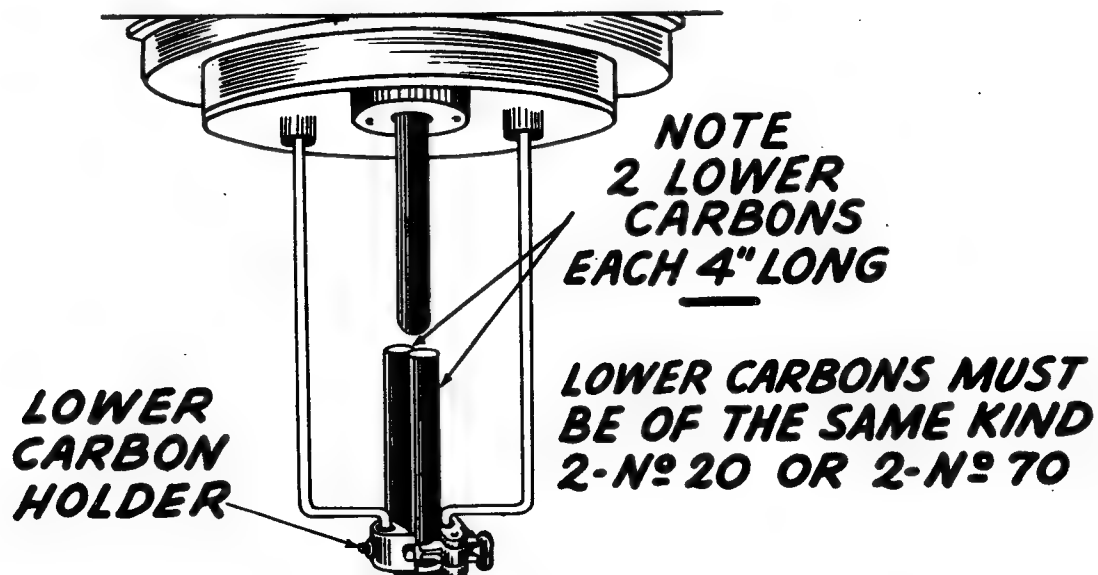
- 1 - In trimming the Arc Lamp, insert a $\frac{1}{2}$ x 12 inch (305 mm) electrode, either #70 solid or #20 cored, in the upper carbon holder, passing it through the bushing of the gas chamber and through both rings of the clutch which lifts the upper electrode. Tighten up the thumb screw so the carbon will be held securely in the upper carbon holder.
- 2 - TWO carbons are employed in the lower holder for the purpose of insuring full 24-hour life and a minimum amount of downward travel of the Arc.

NOTE: The lower carbon holder of this Arc Lamp is designed to take TWO $\frac{1}{2}$ x 4" carbons. These may be either TWO #20 Cored carbons or TWO #70 Solid carbons. Kindly bear in mind that when #20 Cored carbons are used in the lower holder, an opposite carbon, such as #70 Solid, must be used in the upper holder. If TWO #70 Solid carbons are used in the lower holder, #20 Cored carbons should be used in the upper holder.

CAUTION:

DO NOT TIGHTEN THE LOWER CARBONS TOO TIGHT. IF SO, THE CARBONS MAY CRACK.

By using TWO carbons in the lower holder, it is possible to burn the Arc Lamp overnight or 24 hours.



OPERATION

- 1 - After the Weather-Ometer has been assembled and the water and electrical connections made according to the instructions found in the installation booklet, the equipment is ready for use.

- 2 - WALL SWITCH

Disconnect all electrical circuits.

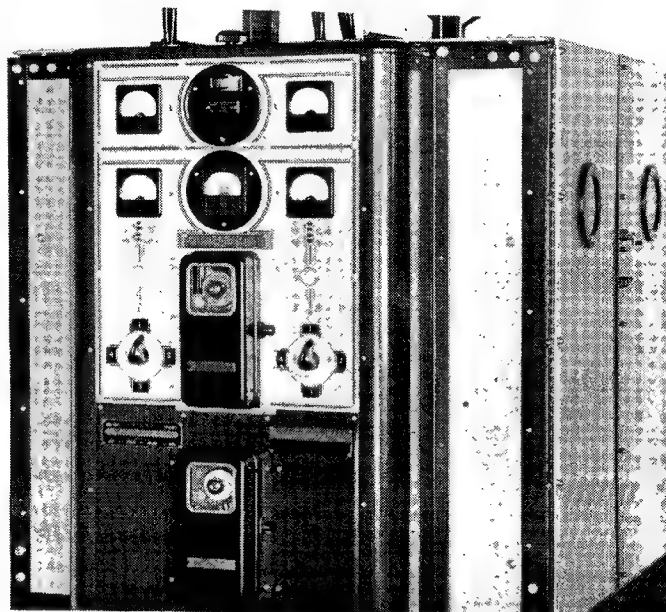
PILOT LIGHTS

3. - Illuminated (red) when mainline Wall Switch is in "closed" position. Do not attempt to change carbon when the Pilot Light is "red."

- 4 - "ON" and "OFF" TOGGLE SWITCHES

This gang toggle switch located on the right of control panel below the ammeter controls all of the circuits of the Weather-Ometer except the blower circuit. The fuse blocks are still energized when this switch is in the "OFF" position.

CAUTION: When renewing carbons or adjusting or inspecting any electrical parts of circuit, the Wall Switch should be in the "OFF" position.



TEMPERATURE CONTROL

A motor driven blower in the base of the Machine supplies the proper amount of air for cooling and oxidation essential to an accelerated test.

A temperature controller recorder controls the movement of the blower. This recorder is fully described in back of these pages. The same "key" used to wind the clock of this instrument is used to set the temperature selector.

TOP VENTILATOR

Two trap doors make up part of the roof or top of the Machine enclosure. The correct amount of ventilation, when the Machine is in operation, will be governed by various factors, such as Room Temperature, Room Air Currents or Drafts, Desired Temperature required in test.

WATER PAN

A tank or sump below the specimen drum provides both a receptacle for the spent water from the two spray units and a floor to the testing chamber. Because of bacteria growth and mineral deposits, the tank or sump should be cleaned out at frequent intervals.

A water spray contacting the outside of the testing drum produces a cooling effect and at the same time increases the relative humidity of the chamber.

CAUTION: It is not advisable to conduct a Weather-Ometer test with the side or cooling spray inactive, unless temperatures higher than 150°F or 65°C are desired.

SPECIMEN SPRAY

In the rear of the testing drum is located the mild spray unit. This unit is designed to accommodate several types of nozzles or tips. The tips or nozzles differ only in shape and volume of water released.

The nature of the material to be tested will determine the tip or nozzle best suited for the work.

NOTE: The duration of the spray period is determined by the Cycle Cam. The force of the spray is determined by manual adjustment governed by good judgment.

- #9200-PX GLOBE -

- 1 Place the small asbestos pad in the bottom of the globe. Place globe in position with its upper edge properly seated against the upper side of the gas check plate, and swing the wire bail in position against the bottom of the globe. The tension of this wire bail should permit the globe to be rotated by grasping the globe between both hands. This seating is important, if air enters globe at upper edge, the life of the electrodes will be shorter by 6 to 10 hours. Globes must be free from chips or cracks and kept clean.

- 2 This globe is of a special pyrex for transmission of the same wavelengths found in sunlight. Globes must be free of chips or cracks and kept clean for reliable results.

After each 24 hours of use, globes should be washed with granulated or other soap, dried and polished thoroughly.

By keeping on hand an extra globe which has been cleaned and polished, no testing time will be lost. Globes should be discarded after approx. 1500 hours use as they will have become so etched and solarized (pink in color) that they will not permit the proper transmission of active light.

- LENGTH OF ARC -

- 3 The Fade-Ometer is now ready to operate and the switch may be closed. The arc should start immediately and within a few seconds settle down to a steady intensity. The arc, to have proper fading qualities, is longer than an ordinary illuminating arc or motion picture arc. Do not be alarmed at the length of the arc. It will be from $1\frac{1}{2}$ to 2 inches long.

- WHEN FIRST TURNING ON -

- 4 A slightly colored gas will form inside the glass globe. In less than a minute this gas will clear out. If a brown deposit forms in the globe, look for chip in edge of globe or for cracked bushing. Excess air has entered the globe. Correct before continuing with test.

FDA-R-6-INST. 10140

OPERATION

- 1 After the Weather-Ometer has been assembled and the water and electrical connections made according to the instructions found in the installation booklet, the equipment is ready for use.

WALL SWITCH

- 2 Disconnects all electrical circuits.

PILOT LIGHTS

- 3 Illuminated (red) when main line Wall Switch is in closed position. Do not attempt to change carbon when Pilot Light is red.

ON AND OFF TOGGLE SWITCHES

- 4 This gang toggle switch located on the right of control panel below the ammeter controls all of the circuits of the Weather-Ometer except the blower circuit. The fuse blocks are still energized when this switch is in the "OFF" position.
- 5 CAUTION: When renewing carbons, or adjusting or inspecting any electrical parts of circuit, the Wall Switch should be in the "OFF" position.

TRIMMING ARC LAMPS (Renewing carbon electrodes)

- 6 Wall Switch must be in the "OFF" position.
- 7 Elevate Arcs by means of the locking lever located on the right side center of cabinet.

VOLTMETER AND AMMETER

- 1 Each arc is provided with a voltmeter and ammeter for the purpose of indicating electrical status of the arc. Since approximately 15 minutes are required for the arc to settle down to a steady flame, disregard the meter readings until the arc is stabilized.

VOLTMETER SWITCH

(Gang toggle below voltmeter)

- 2 This double throw switch permits reading Line or Arc Volts on the same meter.

VOLTAGE ADJUSTMENT

- 3 The Weather-Ometer has an operating range from 208 to 250 Volts. Each machine is set for the voltage specified by the purchaser. Occasionally the voltage given when ordering does not correspond with the actual line voltage at the Weather-Ometer. See instructions on the wiring diagram at the back of this folder, and make the necessary changes in the connections of the reactance coil. Once the proper connections are made in the reactance coil, no further changes are necessary unless the line voltage is permanently changed.
- 4 At the bottom of the control panel are two voltage adjusting switches, one for each arc. These are identified as to the arc they control and are for adjusting minor voltage changes. They cut in or out a limited amount of resistance, increasing or decreasing the arc voltage and amperage as desired.

VOLTAGE ADJUSTMENT (Cont'd)

- 1 Always start the arcs with the voltage adjusting switch in the "1" position (all resistance in the circuit). After burning 15 minutes, read line and arc volts and amperes for each arc.
- 2 Amperes should be hovering (not fixed) between 15 to 17, rather 17 amps., arc voltage between 120 to 145 volts. If amperes are less than 15, turn switch "2", "3", or "4" position to bring the amperage and volts to the desired range, favoring 17 amps. rather than 15.
- 3 NOTE: Occasional dips in line or arc voltage should not be confused with a constant low voltage condition.
- 4 Line voltages are usually lower during the day and higher at night. The operator will soon acquire the knack of setting and adjusting switches for day and night operation according to the prevailing conditions.
- 5 NOTE: Ampere and arc voltage readings on the meters will never remain fixed for any length of time. Disregard slight fluctuations; they are due to the other electrical loads on the same line.

VENTILATOR BLOWER

(Located below the water pan)

- 6 The blower motor connected in series with the Thermo-Regulator, will get start when the air temperature of the testing chamber is approximately $3^{\circ} + -$ of the temperature selected on the regulator.

THERMO-REGULATOR

- 1 Turn knob so dial indicates desired air temperature of testing chamber in Fahrenheit.

TRAP DOORS

- 2 Unless temperatures above 140° are desired, the rear top trap door should be raised to the first notch at all times. The front door is only raised when servicing the lamp and samples.

WATER PAN

- 3 The tank below the specimen drum provides both a receptacle for the water from the two spray units and a floor to the testing chamber. Because of bacteria growth and mineral deposits the tank should be cleaned out at least once a week.

SPECIMEN DRUM

- 4 The specimen drum rests on a driven spider. This spider rotates by means of a suitable shaft, friction gears, reducer and motor and revolves at approximately 1 R.P.M. Spacers are provided to accommodate 7/16" thick specimens. For metal panels or other thin materials, holders are furnished to fit into the spacers. Special holders for different materials can be furnished on request.
- 5 In preparing test samples, it is necessary to seal all sides and edges to prevent water from undermining the coating.

DRUM COOLING SPRAY

1 This set of two fish tail nozzles on the outside of the testing drums cools the drum and increases the humidity. This outside spray is electrically controlled and operates only while the Weather-Ometer is in service.

2 The volume of water from this set of sprays may be adjusted by the valve in the line just ahead of the nozzles.

3 CAUTION: Do not operate without drum cooling spray unless temperatures higher than 140° F. are desired.

MILD SPRAY

4 Located in rear of testing drum, consisting of 4 Fish Tail Spray nozzles, Type FT. Actuated by Cycle Time Meter. In operation during water periods only. The force of the spray can be regulated at each set of sprays.



5 Water to be used in spraying specimens must be clean, in other words, "Fit to drink".

6 NOTE: The force of the spray should be governed by good judgment, sufficient only to thoroughly drench, wash and cool the samples.



CYCLE TIME METER

7 This meter automatically controls the light and water periods. The cycle found to give best results is known as 17-3, or 3 minutes of Spray once every 17 minutes. This cycle corresponds with the cycle so long in use in the open model Weather-Ometers (BW-M Type).

CYCLE TIME METER (Cont'd)

- 1 The dial 17-3 permits the light to remain on for the full period (22 to 24 hours) but opens and closes the solenoid valve (water spray) for a 3 minute period at the end of every 17 minute period.
- 2 Other cams can be provided that will interrupt the light and start the water spray at predetermined intervals. Installing different cams is a matter of a few minutes time with the aid of a screw driver. The only requirement for different cycles is that the total time, light and water, must add up to 24 hours per dial.
- 3 NOTE: When starting the machine for the next run, it is not necessary to turn the cam unless it should be on the water period. Then turn by means of small knurled wheel on the lower right of cam.
- 4 CAUTION: Turn so cam rotates counter clockwise;  that is, the knurled wheel should be turned in the opposite direction, clockwise . If this precaution is observed, the contacting finger on the micro switch will not be caught in the dial slot and bent.
- 5 The Cycle Time Meter employs two micro switches: first, left MM, the water spray only; second, top LL, the light only. When contact finger engages a slot, the respective circuit is opened or closed as the case may be.

THE TIME SWITCH

1. LOCATED AT THE BOTTOM OF THE CONTROL PANEL, THIS TIME SWITCH MAKES IT POSSIBLE TO OPERATE THE MACHINE FOR ANY PREDETERMINED TIME UP TO 24 HOURS.
2. THE FIXTED POINTER ON THE HOUR DIAL IS SO ARRANGED THAT WHEN THE POINTER TRIPS THE "OFF" LEVER, THE DIAL WILL BE AT ZERO, OR THE 24TH HOUR. THE SMALL DIAL AT RIGHT OF THE HOUR DIAL IS AN ADDED REFINEMENT FOR RESETTING.
3. WHEN SETTING THE TIME CLOCK, ALWAYS USE THE SMALL KNURLED KNOB ON THE POST AT THE RIGHT OF THE MINUTE DIAL. THIS TURNS BOTH THE MINUTE AND HOUR DIALS AND IS THE ONLY METHOD THAT SHOULD EVER BE USED IN SETTING THE CLOCK.
4. CAUTION: IN RESETTING THE TIME CLOCK, NEVER ATTEMPT TO TURN THE DIAL CLOCKWISE IF THE POINTER HAS PASSED THE "SHUT OFF" LEVER, UNTIL THE "SHUT OFF" LEVER HAS BEEN RELEASED BY PUSHING IT DOWN, AND HOLDING IT WHILE POINTER IS PASSING IT.
5. THE DIAL ON THIS SWITCH IS MARKED OFF INTO 24 EQUAL SPACES ONE HOUR APART. SET THIS SWITCH (ONCE EVERY 24 HOURS) BY TURNING THE SMALL KNURLED KNOB CLOCKWISE  , SO THAT THE 24 HOUR DIAL WILL ROTATE COUNTER-CLOCKWISE  , AND STOP AT THE FIGURE INDICATING THE TOTAL NUMBER OF HOURS SELECTED FOR THE DAY'S RUN.
6. AFTER CLOCK HAS BEEN SET FOR THE DESIRED NUMBER OF HOURS, PUSH THE "ON" LEVER SLIGHTLY DOWNWARD UNTIL IT ENGAGES AND LOCKS THE "OFF" LEVER. THE MACHINE IS THEN READY TO START BY CLOSING THE MAIN LINE SWITCH.

TIME SWITCH (Cont'd)

- 1 This time switch breaks the arcs, both water valve circuits, and cycle meter.
- 2 The Main Line Switch on the wall renders the entire Weather-Ometer dead.
- 3 Pilot lights "On", indicate when the control panel is energized.

RUNNING TIME METER




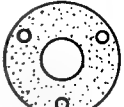

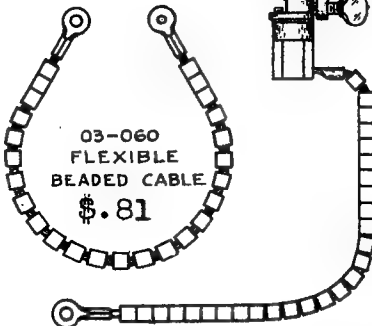

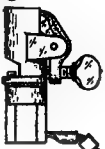
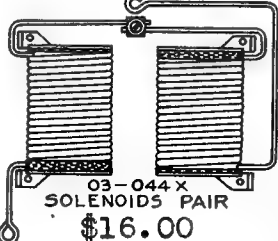
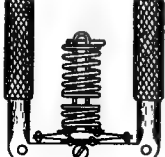
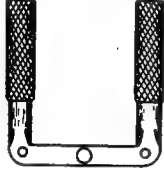


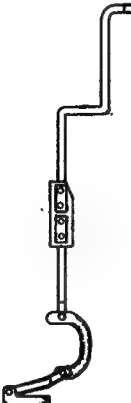





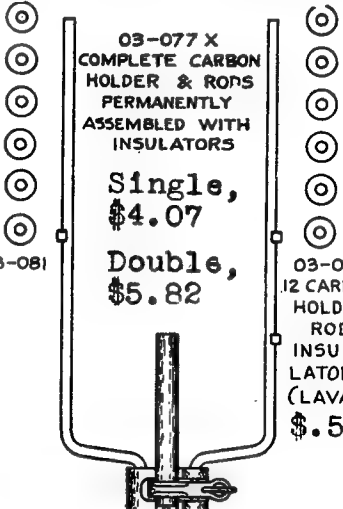

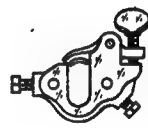

(Located below thermo-regulator)

- 4 This counter records the number of arc light hours only. It operates only when the arcs are on and through the left arc lamp.
- 5 To ascertain the light exposure hour of any given sample, subtract the starting reading from the reading at time of observation or completion.

PARTS LIST

ATLAS ENCLOSED ARC REFERENCE CHART

TO BE HANDED TO THE PERSON IN CHARGE OF FADE-OMETER OR WEATHER-OMETER
No. _____ IN YOUR LABORATORY. VOLTS _____ CURRENT _____ TYPE _____

<p>03-086X GAS CHAMBER COMPLETE INCLUDES THESE 4 ITEMS & SCREWS \$4.72</p>  <p>03-086 GAS CHAMBER \$2.50</p>  <p>03-085 FEED FLOOR, METAL \$1.26</p>  <p>03-088 LAVA CARBON GUIDE \$0.51</p>  <p>03-085B LAVA FEED FLOOR \$0.45</p>	<p>A.C. ONLY-03-937L D.C. ONLY-03-053 UPPER CARBON HOLDER ONLY \$2.23</p>  <p>03-060 FLEXIBLE BEADED CABLE \$0.81</p>  <p>03-055 PORCELAIN SLIDE \$0.71</p> 	<p>A.C. ONLY-03-937LX D.C. ONLY-03-053X UPPER CARBON HOLDER COMPLETE \$3.75</p> 	 <p>03-044 X SOLENOIDS PAIR \$16.00</p>  <p>03-018 X ARMATURE COMPLETE WITH WAGON SPRING \$11.62</p>	 <p>03-018 LAMINATED ARMATURE ONLY \$8.30</p>  <p>03-028 X WAGON SPRING COMPLETE \$3.32</p>
 <p>03-031 LIFTING LINK ONLY \$3.11</p>  <p>03-039 X CLUTCH WITH LINK COMPLETE \$5.71</p>  <p>03-082 DASH POT \$6.35</p>	 <p>03-039 CLUTCH ONLY \$2.60</p>  <p>03-955 FLEXIBLE BALL & SOCKET JOINT \$1.25</p>  <p>03-082 X DASHPOT COMPLETE WITH FLEXIBLE BALL & SOCKET JOINT \$7.60</p>  <p>03-073 SLIDE ROD (PAIR) \$2.70</p>	<p>03-077--Lower Carbon Holder Rods, Pair \$1.45</p>  <p>03-077 X COMPLETE CARBON HOLDER & RODS PERMANENTLY ASSEMBLED WITH INSULATORS Single, \$4.07 Double, \$5.82</p> <p>03-081 12 CARBON HOLDER ROD INSU- LATORS (LAVA) \$0.52</p> <p style="text-align: center;">SPECIFY SINGLE OR DOUBLE CARBON HOLDER</p>		
 <p>03-075 SLIDE ROD SPRING (PAIR) \$0.18</p>  <p>03-078 L 2 LOWER CARBON HOLDER-DOUBLE 2-CARBONS \$3.85</p>  <p>03-078 L S LOWER CARBON HOLDER-SINGLE 1-CARBON \$2.10</p>				

CERTIFICATION

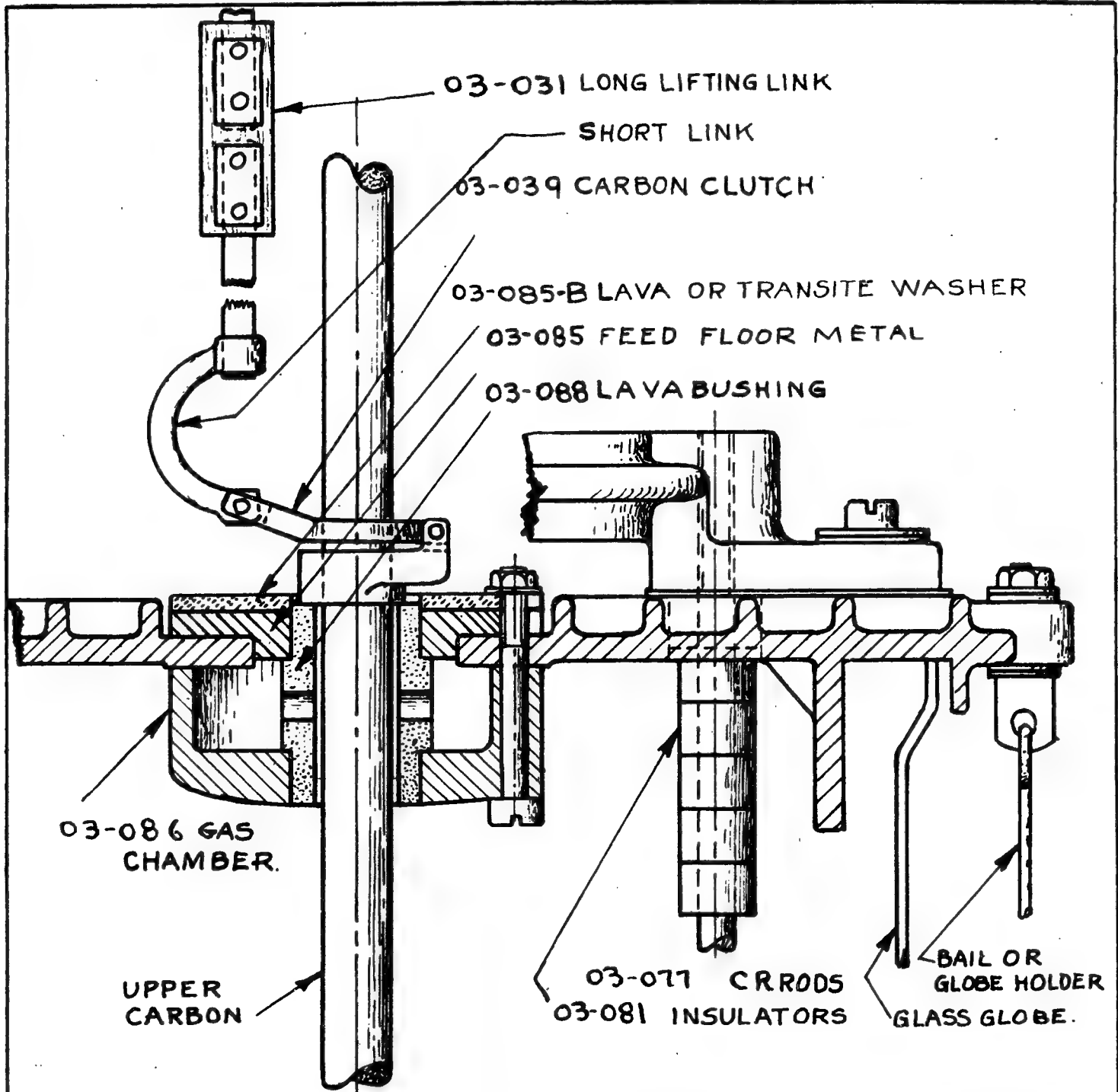
We certify the prices shown are not in excess of maximum prices permitted by the Office of Price Administration.

Printed in U.S.A.

ATLAS ELECTRIC DEVICES CO.
361 W. Superior St.
Chicago, Ill.

--Immediate Shipment--
All Prices F.O.B. Chicago.

E.C. PARTS & PRICES 10142 FOR
1/2"x12" ENCLOSED OMETER ARC



DETAIL SHOWING
CARBON CLUTCH AND
GAS CHAMBER
FOR
ENCLOSED ARC

ATLAS ELECTRIC DEVICES CO
CHICAGO ILLINOIS U.S.A.

DRAWN	CHECKED	DATE	SHEET NO
M.R.B.	C.W.J.	9/6/34	FO. 1028

INSTALLATION INSTRUCTIONS

THESE INSTRUCTIONS REFER TO THE INSTALLATION OF THE NEW LAVA TYPE GAS CHAMBER AND FEED FLOOR USED ON ALL ATLAS ENCLOSED ARC LAMPS.

FIRST - SEE PRINT NO. FO-1028

REMOVING OLD GAS CHAMBER

The burnt out or defective gas chamber can easily be removed by shearing off the heads of the three screws with a sharp cold chisel. These screw heads are found on the under side of the gas chamber. After these have been sheared off, strike the burnt out casting a few sharp blows and it will drop off. Next remove the upper casting or feed floor.

NEW LAVA TYPE GAS CHAMBER AND FEED FLOOR

This consists of four pieces. First, the lower casting, #03-086, which is similar to the old gas chamber. Second, the lava bushing, #03-088. Third, the feed floor which is also a casting. Fourth, the lava washer.

These two castings with lava bushing are assembled in the same manner as the old type, with the exception that, after the three screws are tightened up, the lava washer is laid on top of the feed floor. You will note that two of the screws are about one-fourth of an inch longer. They should pass through the lava washer, one in front and one to the right, facing the carbon holder. The shorter screw should be placed in back. This screw does not pass all the way through the lava washer. If it did, there would be danger of short-circuiting on the carbon clutch that comes in close proximity.

When all the screws and nuts are tightened up, one should be able to turn the lava bushing, #03-088, slightly. If it is fitted too tight, it will crack, due to the heat generated by the arc.

When these parts are assembled, you will note there is a small recess between the top of the lava washer and the lava bushing. This is designed on purpose, so as to allow the lower part of the clutch (#03-039) to drop down on top of the bushing when the arc feeds.

Should you have occasion to order additional set of gas chamber and feed floor, kindly mention No. 03-086X.

ATLAS ELECTRIC DEVICES CO., INC.
361 WEST SUPERIOR STREET, CHICAGO, ILL., U.S.A.

Gas Chamber 12-4-36

MAINTENANCE

PEN ARM — PENS

Removable Pen Arms

To prevent damage to pen arms, it is advisable to remove them when work on the instrument necessitates the removal of the chart disc, especially when the pen lifter has more than one arm.

To Remove Pen-Arm: Hold the pen-arm bracket (Item 11, Fig. 5823) to prevent side motion and springing out of calibration. With fingernail, knife blade or small screw driver raise the upper end of the pen-arm over the stud, at the same time sliding the pen-arm downward.

To Replace Pen-Arm: Hold the pen-arm bracket with fingers to prevent springing out of calibration. Place the pen-arm in position so that the rivet in the pen-arm will slide into the slot in the bracket, and the open end of the pen-arm will slide over the taper stud. With the pen-arm in this position, simply push it into place.

V-Pens

Caution: Do not change angle of pens from that shown in Fig 3207. Pens for a two pen instrument are shown. In a single pen instrument, the pen makes a right angle with the chart.



Fig. 3207

To Ink a "V" Pen: Use the dropper, and put a drop or two of ink in the pen. At normal temperatures and with ordinary records, this amount will last for days. See if the ink is feeding by drawing a piece of smooth paper across point of the pen. If the ink does not flow freely, a moistened piece of paper held against the pen point will start it.

"V" Pen Adjustment: Careless handling in transportation may alter the correct adjustment of the pen. Slip the pen in or out of the holder (it is only friction-tight) until it touches the chart. Do not bend the pen-arm to obtain adjustment. If, after long use, the pen makes a heavy line, it is wasting ink. Put in a new pen.

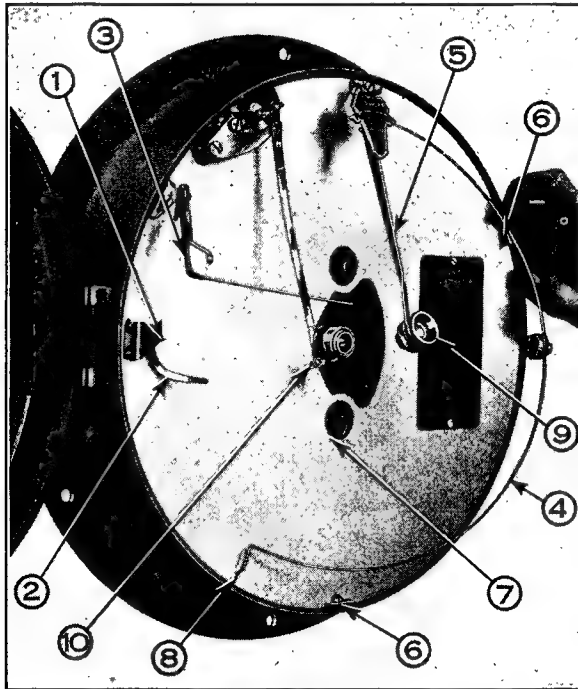


Fig. 4015

KEY TO FIG. 4015

1. Time Set Pointer
2. Guide Finger
3. Pen Lifter
4. Wire Chart Holder
5. Chart Hub Holder
6. Wedge Fasteners
7. Clip
8. Slot in Chart Disc
9. Chart Hub
10. Pen

Chart Holder (Fig. 4015)

The chart holder assembly is fastened directly to the case, but it is unnecessary to remove it when removing the chart disc or changing the chart. It consists of a rigid arm chart hub holder (5) and semi-circular wire chart holder (4). The loop end of the wire chart holder is caught in a slot (8) in the chart disc which keeps the wire chart holder in position and holds the chart flat against the disc. The chart hub (9) is held in the crook at the end of the chart hub holder (5), always in position to be snapped back on the chart hub base after replacement of the chart.

To Change Chart

Lift Pen: Place finger tip under the lever arm on the pen lifter (3) and raise the pen lifter.

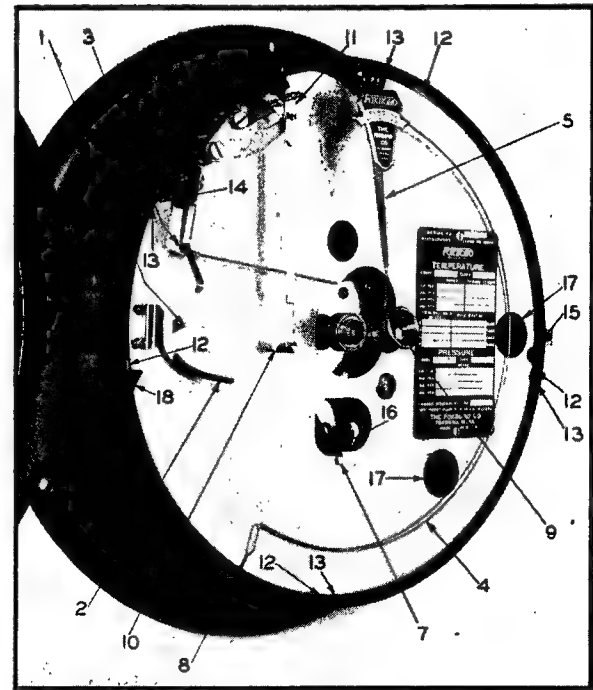


Fig. 5823

KEY TO FIG. 5823

11. Pen Arm Bracket
12. Lugs
13. Chart Disc Stops
14. Projection
15. Chart Disc Stop
16. Thumb Piece
17. Finger Holes
18. Stop

Remove Chart: Place the tips of the first and second fingers behind the knurled rim of the chart hub. Press the button in center with thumb. The chart hub will release instantly. Remove the chart.

(If the instrument contains a mechanical clock, be sure the spring is wound sufficiently to run proper period of time. *Do not wind too tightly*).

Replace Chart: Slip the chart under the wire chart holder, pen index, pen lifter, and time set pointer (1). Place hole in the chart over the collar on the chart hub base and insert the hub in the base. Grasp the hub by the knurled rim and push straight in. It will automatically snap into position. Do not press guide finger on the time set pointer toward the chart disc as this will cause the chart to stick and prevent its turning easily.

Adjust for Time: Turn the chart hub to the left until the proper time arc is indicated by the time set pointer. (Note day and night sections on chart.) Ink pen as described on the following page and close door. The pen will be automatically adjusted to the chart when the door is latched.

Time Set Pointer (Fig. 4015)

The time set pointer (1) is properly adjusted when the instrument leaves the Factory and seldom needs adjustment. It is designed for ease in accurately adjusting the charts to the desired time arc, so that it is not necessary to have the pen on or near the chart to adjust the chart for time. The guide finger (2) on the time set pointer is for the purpose of guiding the chart under the time set pointer. The time set pointer and the pen point must indicate the same time arc.

To Adjust Time Set Pointer: Place the chart on the instrument. This adjustment should be made when the pen is near the outer edge of the chart because the chart can be located more accurately when the pen is in that position. Be sure the chart disc (see below) is in position. Slightly loosen the two screws that hold the pointer to the chart disc. Turn the chart until the pen point rests exactly on the time arc. Adjust the time set pointer to indicate the same time arc. On instruments subject to overrange the time set pointer should be set so that the pen point will pass the pointer. Tighten the two screws.

Chart Discs

The wedge-fastened chart disc (Fig. 4015) is readily recognized by the odd-shaped hole around the chart hub and the two finger holes above and below the hub.

The self-locking chart disc (Fig. 5823) is readily recognized by the small egg-shaped hole around the chart hub and the finger holes (17) on the right-hand side.

Wedge-Fastened Disc (Fig. 4015): The chart disc rests on several lugs on the side of the case and is held in place by sliding wedge fasteners (6) and a notch under the pen lifter (3). It is also held rigidly below the chart hub (9) by a clip (7) which pivots on the lower clock screw. To remove the disc, first twist the lower end of the wire chart holder (4) in a counter-clockwise direction until the end loop can be pulled through the slot (8) in the disc. Turn the clip (7) slightly to the right to release the chart disc. Slide out each wedge fastener (6) with the thumb or the forefinger, grasp the free end between the thumb and the finger and push into the slotted post. Remove the chart disc with a slight outward pull to lift it over the wedge fasteners and a slight downward motion to free it from the base of the pen lifter and the chart holder mounting. To replace the disc, reverse the above operation.

Self-Locking Disc (Fig. 5823): The Foxboro self-locking chart disc rests on four lugs at (12). It is correctly positioned by stops at (13) and (15), and held in place by projections (14) and (15) and the clip (7).

To Remove Disc: First raise the pen lifter and the chart hub. Release the lower end of the wire chart holder by turning counter-clockwise until the end loop can be pulled through the slot in the disc. Catch this end around the chart hub. Push the thumb piece (16) clockwise, which releases clip (7). Grasp the disc through the two holes (17), remove with a motion to the left and then a slight outward movement to the right.

To Replace Disc: First place V-notch in the left side of disc firmly against the V-shaped stop (18) with the upper edge of the notch resting on lug (12) adjacent to stop (18). Move the disc in until it rests on the other three lugs and to the right against the right hand stop, (13) (it automatically centers itself against the other stops). Swing clip L counter-clockwise until it locks over the disc in the notch.

MECHANICAL AND ELECTRICAL CLOCKS

Mechanical Clock

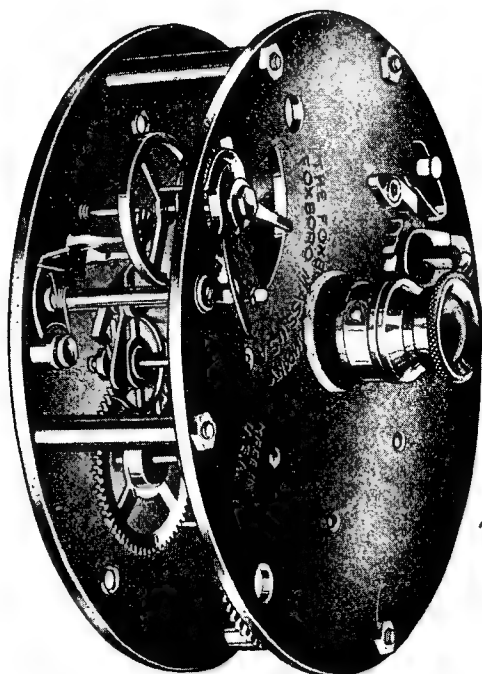


Fig. 5985

Clocks with various periods of winding are furnished. Be sure the spring is wound sufficiently to run the proper period of time, but not wound too tightly. Extension handle keys are supplied for easy winding.

When it is necessary to have the clock serviced, remove it from the instrument.

Removing the Clock

Remove the pen arm, chart and chart disc. Remove the screw in the chart hub base, then unscrew the chart hub base. Remove the three screws extending through the top of clock box and lift clock out.

Replacing the Clock

Remove the nuts from the screws which extend through the bottom of the clock box. The three holes in the clock match those in the case in one position only. Find correct position and fasten the clock in place with screws furnished. Replace the chart hub base and screw. Replace the chart disc and chart. Check setting of the time set pointer and adjust if necessary.

Boxing and Shipping the Clock

Retain in a clock box, stuffing with soft paper. Then pack in a larger box with cushion of excelsior, or other soft packing material, on all sides. Address plainly to The Foxboro Company, Foxboro, Mass., U. S. A.

Cleaning and Oiling the Clock

Mechanical clocks should be cleaned and oiled once a year. If service is severe they should be oiled more frequently. Send to The Foxboro Company.

ROTAX INSTRUMENTS FOR ELECTRIC OPERATION MAINTENANCE

Once installed, the Instrument should require no further attention or maintenance except to see that the cover or door is tightly closed at all times to keep out dust or corrosive fumes.

Rotax Brush and Commutator Assembly

If because of abnormal conditions or careless handling the brush and commutator assembly becomes damaged, it is advisable to return it to Foxboro for repair. The surfaces are carefully burnished and the spring tension definitely adjusted before the instrument is calibrated. Any increase in brush tension may affect the calibration, response or current-carrying capacity of the contacts.

If the contact area becomes dirty, resulting in poor contact, they may be readily cleaned with benzine or ether. Do not use carbon-tetrachloride or Carbona as it leaves a film of chloride on silver surfaces which may reduce the conductivity. Use a piece of clean bond paper with two edges that are clean cut and free from lint, such as would be obtained by tearing off the lower right hand corner of this sheet.

Disconnect or shut-off the power supply before cleaning.

Dip the paper in the cleaning solution and pass it between the brush and the segment — *do not* press on the brush with a pencil or other instrument — the normal spring tension of the brush should be sufficient. *Do not* lift the brush from the segment — simply pass the paper between them.

BENZINE AND ETHER ARE HIGHLY INFLAMMABLE — BE SURE ALL CURRENT SUPPLY IS SHUT-OFF. BE SURE ALL CLEANER HAS EVAPORATED BEFORE CLOSING THE CASE OR AN EXPLOSIVE MIXTURE MAY ACCUMULATE WHICH WILL BE IGNITED IF THE RELAY OR CONTROLLED CONTACTS SPARK.

Contact Spacing Adjustment

The point at which a segment and brush make contact, closing the electrical circuit, may be changed by means of the control point setting key or knob, or by turning the micrometer adjusting screws on the individual discs. Turning the screw *clock-wise* will move the point of contact *down* scale; *counter-clockwise*, *up* scale. Since the control point indicates the position of the contact, it may be necessary to readjust as mentioned below.

The adjustment screws turn easily; do not bear too heavily or the assembly may be thrown out of alignment. Use a small screw-driver, such as used to tighten eye-glasses, held between the thumb and index finger of the right hand. Hold the assembly from moving with the thumb and index finger of the left hand at the pivot point.

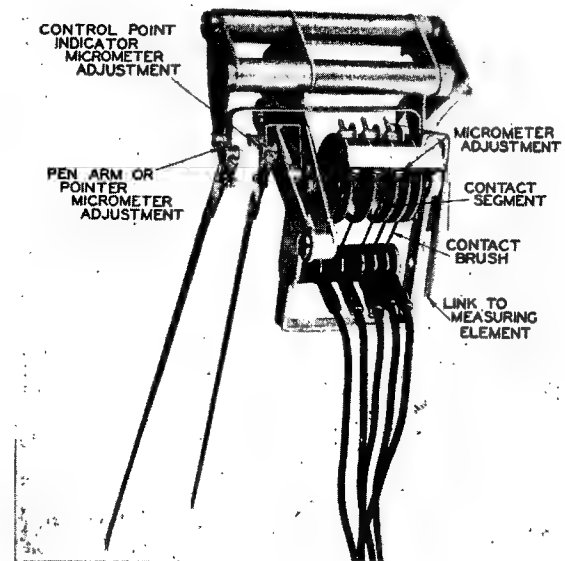


Fig. 6315

Control Point Index — Adjustment

The control point index-arm may be set to show the position of any one of the several contacts, and is adjusted by means of the micrometer screw just above the pivot point. Turning the screw *clockwise* moves the pointer *down* scale; *counter-clockwise*, moves the pointer *up* scale.

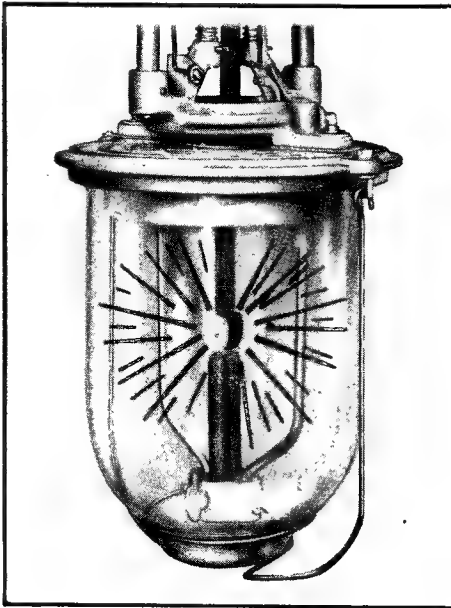
Contact Identification

Contacts are numbered consecutively from the top or front to the back, the last disc being the common. Contacts which close on increasing measurement are designated as *plus*, and contacts closing on decreasing are designated as *minus*. An assembly designated as "1+2+3-4" is an assembly consisting of four commutators, the first two of which close the circuit on increasing measurement, the third on decreasing measurement, and the fourth the common disc. Each brush lead is tagged with a numbered metal marker to show the brush and disc to which it is connected.

IMPORTANCE OF CLEAN OMETER GLOBES

The modest looking globe on your Fade-Ometer or Weather-Ometer is a very important part of this equipment. By excluding air, the carbons burn much longer, thereby making possible long life and economical operation. Furthermore, the special glass from which the globe is made is partly responsible for making the arc spectrum a close duplicate of the sun. These very important points are of course predicated upon a **CLEAN** glass globe — and glass will get dirty in use. You cannot expect full light intensity, with consequent maximum efficiency and uniformity of results, with a dirty globe. A letter from the National Bureau of Standards is reproduced below to stress the great importance of daily cleaning and polishing.

CLEAN



Clean and Polish Globes Daily for Accurate Results!

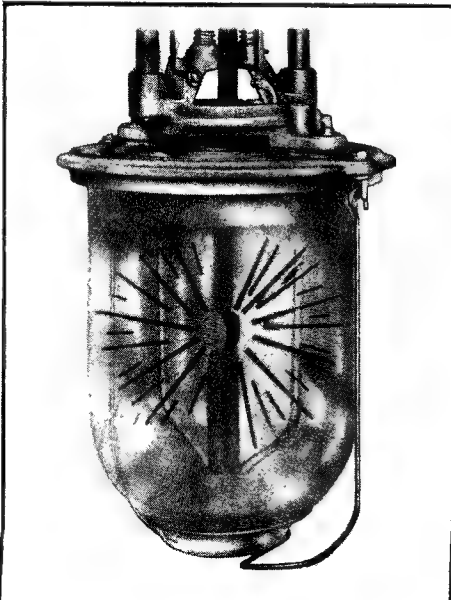
“Ten years ago (September 1929)* we were impressed with the need for washing the globes, based on the following simple experiment. Two new globes were taken from the same box. One of these globes was measured for transmission while new. The other globe was put into service for three months (globe cleaned every day). At the end of three months, the transmission of the used globe was measured (1) while badly smoked, (2) lightly wiped, and (3) washed thoroughly. “The observed transmission in percent, calculated to a constant thickness of glass (1.45 mm) were as follows:

Globe	250-400 mμ	250-310 mμ	310-400 mμ
Used — badly smoked	28	10	45
Used — lightly wiped	33	7	57
Used — washed	56	23	79
New — clean	60	30	83

“These values are only approximate calculations for a difference in thickness from about 2.4 mm to 1.4 mm and may be in error by a few percent, since they apply to a spectral range rather than to a simple wave length. However, you will note that by washing the globe (even after three months of service) it tends to approach a new, unused globe.”

* Globes now furnished are made from heat-resisting ultra-violet transmitting Pyrex, with greater transmission characteristics than the type globe used in the 1929 Bureau of Standards tests.

DIRTY



ATLAS ELECTRIC DEVICES CO.
361 W. Superior St.

CHICAGO

ILLINOIS

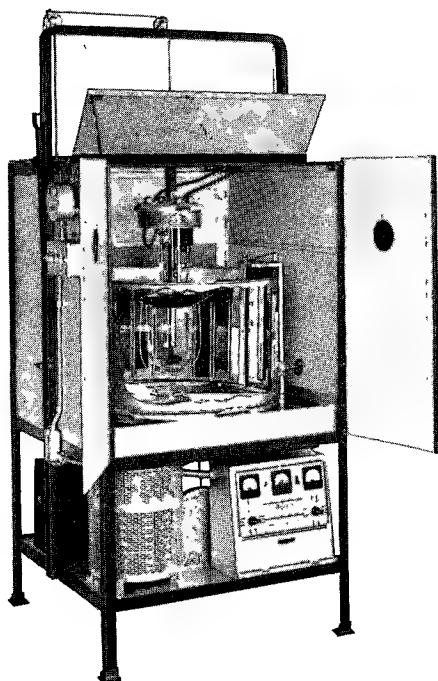
*Sole Manufacturers of Fade-Ometer, Weather-Ometer, Launder-Ometer
International Yardsticks*

THE ATLAS OMETER TRIO

STANDARD LABORATORY INSTRUMENTS OF THE WORLD

FOR DETERMINING DURABILITY AND PERFORMANCE

Mentioned by name or described with sufficient clarity to identify our product in many Government Specifications.



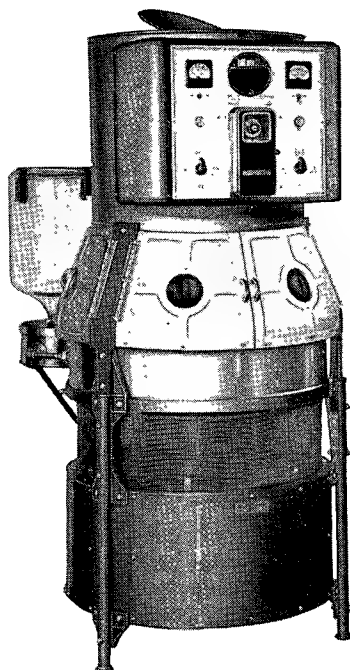
WEATHER-OMETER*

The WEATHER-OMETER provides industry with a laboratory apparatus for duplicating the effect of weather on any kind of material or coatings. Accelerated weathering tests produce failures in a fraction of the time and comparable to out-door exposure.

This efficient and accepted apparatus is available in several models, open and enclosed. All models incorporate features of advanced testing technique, the enclosed models answering a demand for a greater range of detailed control.

Within the compact structure of all WEATHER-OMETERS is the Atlas Violet Carbon Arc, which faithfully reproduces June sunlight for 24-hour operation without further attention, at a carbon cost of approximately one-half cent per burning hour.

Consult us if you have weathering problems in the paint, lacquer, roofing, bitumen, cable, cotton-duck or plastic industries.

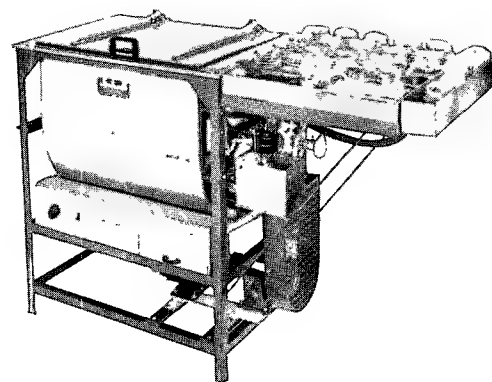


FADE-OMETER*

The FADE-OMETER serves the Textile Industry with a valuable laboratory apparatus by simulating actual sunlight in its destructive qualities. 39 Countries use the FADE-OMETER.

FADE-OMETER Type FDA-R embodies all refinements and controls necessary which engineering skill produced in the past 20 years. Dependable sunfastness forecast can be relied on implicitly, be your problem dyed textiles, ink, plastic, leather, paper, rubber, or other colored products.

The dependable Atlas Violet Carbon Arc, source of radiant energy, provides June Noon-day sun that can be duplicated at any time or place. The FADE-OMETER is designed to operate without manual attention the clock around at a carbon cost of approximately one-half cent per hour.



LAUNDER-OMETER*

The LAUNDER-OMETER is a laboratory testing apparatus to determine the washability of dyeings. Adopted by the A. A. T. C. C. as a standard implies a responsibility of first magnitude, a challenge met by Atlas with a compact durable unit with a capacity of twenty tests in one-pint jars simultaneously.

LAUNDER-OMETER Models with capacity for larger testing jars also available.

All LAUNDER-OMETERS are electrically driven with a choice of Gas, Steam or Electricity for heating the main water bath, with Full Automatic Control.

A Preheating and Loading Table above illustrated with a LAUNDER-OMETER is an indispensable accessory for added efficiency and reducing testing time, can be ordered at your option.

Sole Manufacturers

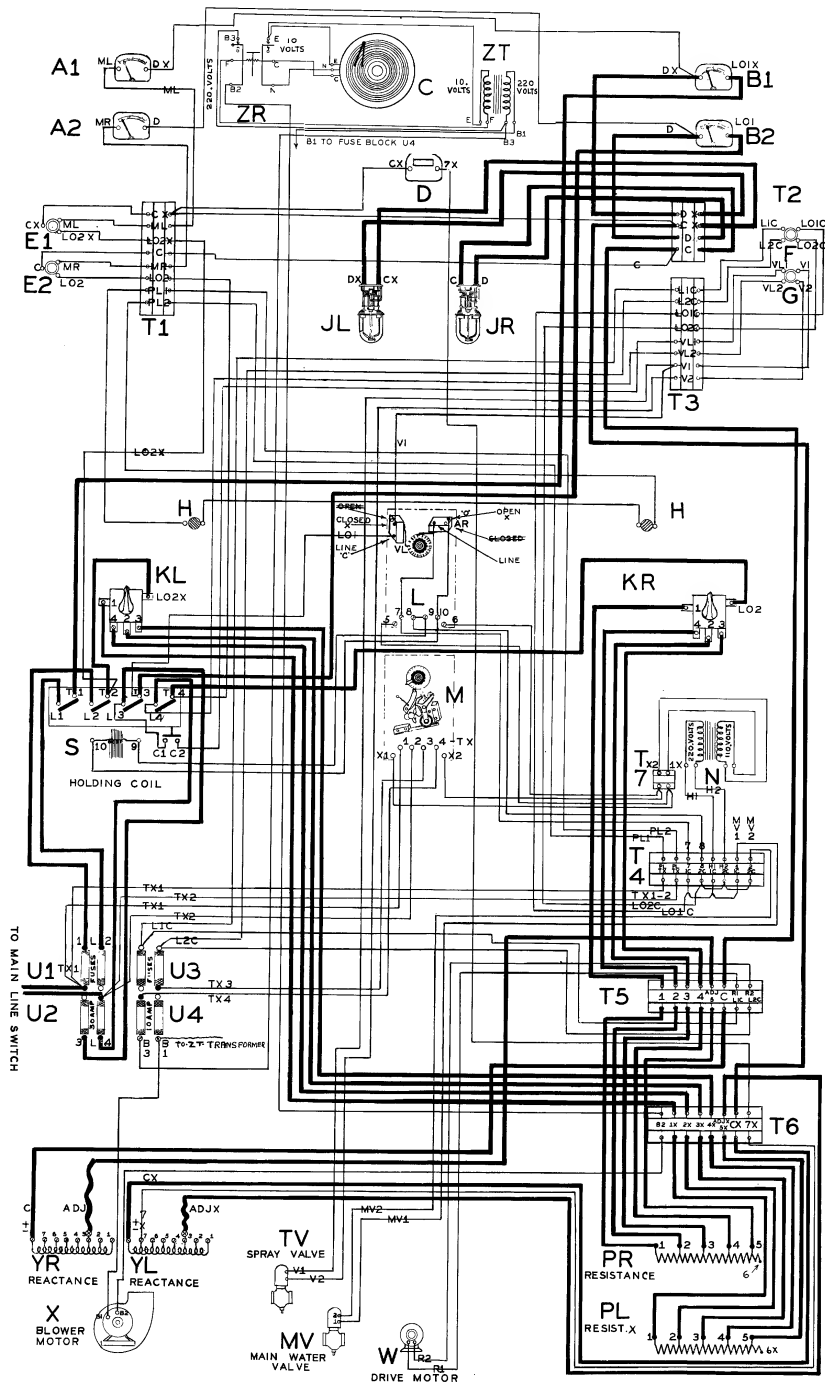
ATLAS ELECTRIC DEVICES COMPANY

CHICAGO, ILLINOIS

* Trade Marks Registered.
Printed in U. S. A.

* Permit no Substitutes.

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0



A1	VOLTMETER	LEFT ARC	W423
A2	VOLTMETER	RIGHT ARC	W423
B1	AMMETER	LEFT ARC	W424
B2	AMMETER	RIGHT ARC	W424
C	CONTROLLER RECORDER	CONNECTED BLOWER X	W424
D	RUNNING TIME METER	CONNECTED 7X YL	W424
E1	TOGGLE SWITCH	FOR A1 ARC/LINE	W442P
E2	TOGGLE SWITCH	FOR A2 ARC/LINE	W442P
F	TOGGLE SWITCH	FOR L&S ON/OFF	W444P
G	TOGGLE SWITCH	FOR TV ON/OFF	W444P
H	PILOT LIGHTS	POWER SUPPLY INDICATOR	W433
JL	ARC LAMP	LEFT	W426R
JR	ARC LAMP	RIGHT	W426R
K	4 PT. VOLTAGE ADJ. SW.	LEFT ARC	ED115P
KR	4 PT. VOLTAGE ADJ. SW.	RIGHT ARC	ED115P
L	CYCLE METER		W445
VL	ARC MICRO SWITCH	FOR ARC TIMING	W452
M	WATER MICRO SWITCH	FOR TV SPRAY	W453
N	TRANSFORMER		W429
MV	MAIN WATER VALVE		W447M
TV	TIME WATER VALVE	SPRAY CYCLE	W447S
S	MAGNETIC SWITCH	FOR ARC LAMPS	4P DS448
T1-T6	1-3-4-5-6 TERMINAL BLOCKS		W449
U1	TERMINAL BLOCK	ARC LAMP LINES	85299-4
U2	TERMINAL BLOCK	115V FOR L & M	85334-2
U3	FUSE	AMPS LEFT ARC	
U4	FUSE	AMPS RIGHT ARC	
U5	FUSE	AMPS FOR MV-N-S-W	
U6	FUSE	AMPS FOR X	
PR	RESISTANCE	LEFT ARC X	W450-L
PL	RESISTANCE	RIGHT ARC	W450-R
W	DRIVE MOTOR	V. HP. RPM. SHAFT	
X	BLOWER MOTOR	V. HP. RPM. SHAFT	
YL	REACTANCE COIL	LEFT ARC	W451-L
YR	REACTANCE COIL	RIGHT ARC	W451-R
ZR	RELAY	10V. COIL 230V. CIRCUIT	
ZT	TRANSFORMER	230V. P. 10V.S	

REACTANCE COILS

- 1-250 VOLTS
- 2-240 VOLTS
- 3-230 VOLTS
- 4-220 VOLTS
- 5-215 VOLTS
- 6-208 VOLTS
- 7-110 VOLTS

NO. 7X-YL IS 110 VOLTS FOR
RUNNING TIME METER D

THIS MACHINE NO. _____
YL & YR CONNECTED TO
TERMINAL NO. _____
ADJ & ADJX TERMINALS ARE
FLEXIBLE AND MAY BE RE-
CONNECTED TO SUIT THE
PREVAILING VOLTAGE AT
MACHINE LOCATION.

WIRING DIAGRAM
WEATHER-OMETER
HV-DL - TWIN ARC
ATLAS ELECTRIC DEVICES CO.
CHICAGO ILL. U.S.A.
DRAWN G.W. CHECKED [Signature] DATE 12-7-75 DR. NO. 500Z DD-CABLE 4PT. K.S. T-BLOCK S-101841 NO. WD 12943

UNCLASSIFIED

File

DIAGRAMS
REFERRED TO IN
INSTRUCTIONS

For the Installation and Operation

of the

FREEZING CABINET

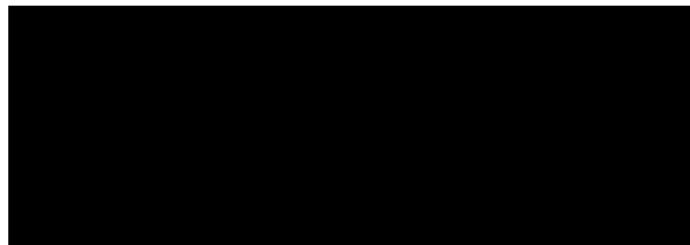
FOR MINUS 60° D Operation

Type FC-DR

Serial No. SPA-417

Voltage 220

Cycles 50



STATINTL

Sole Manufacturers
ATLAS ELECTRIC DEVICES CO.
INCORPORATED
CHICAGO, ILLINOIS, U. S. A.

UNCLASSIFIED

FADE-OMETER

WEATHER-OMETER

LAUNDER-OMETER

45. 324751 - 220V, 3 ϕ - 500W - 1500 RPM
 BB, -
 Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

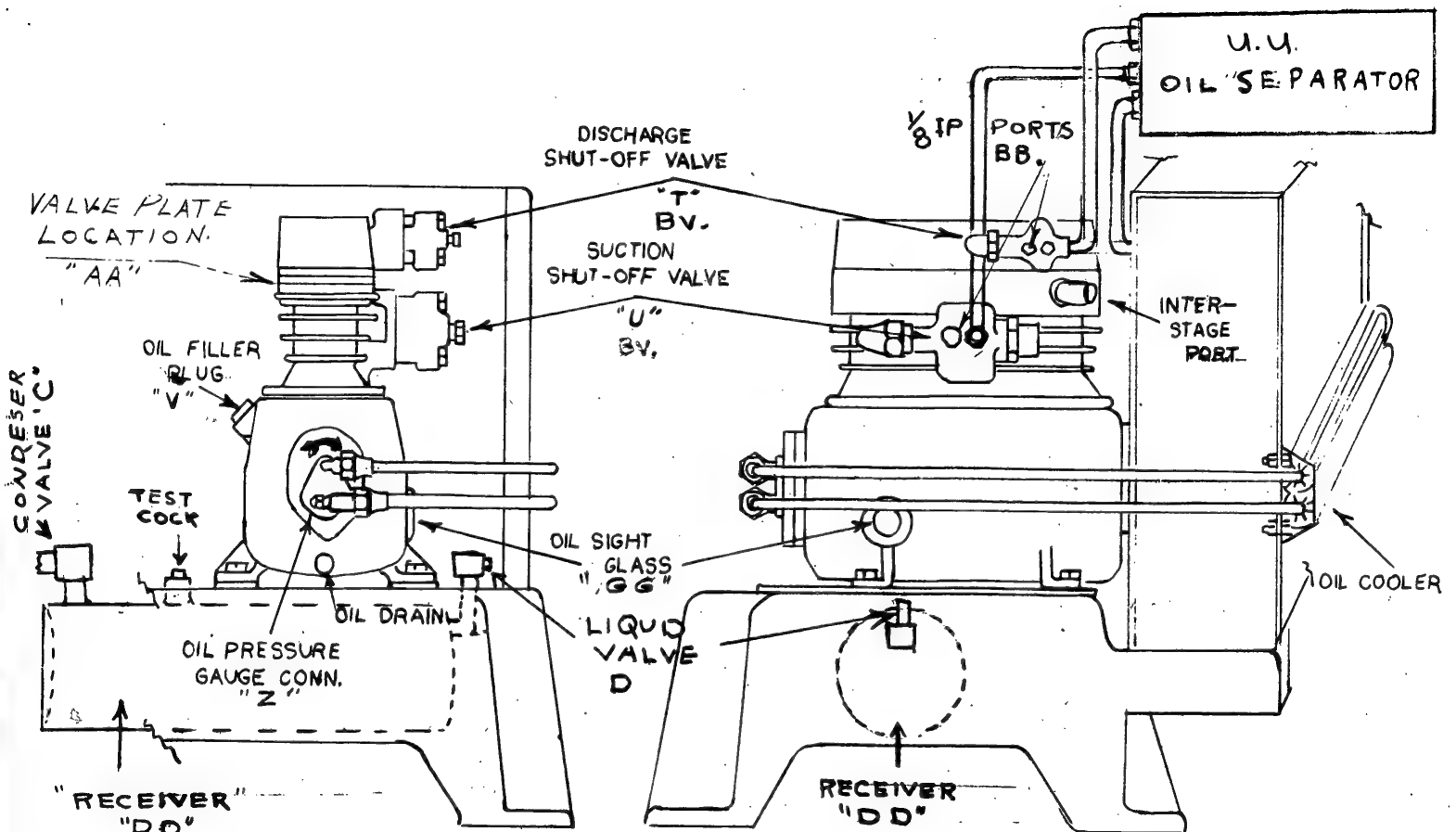
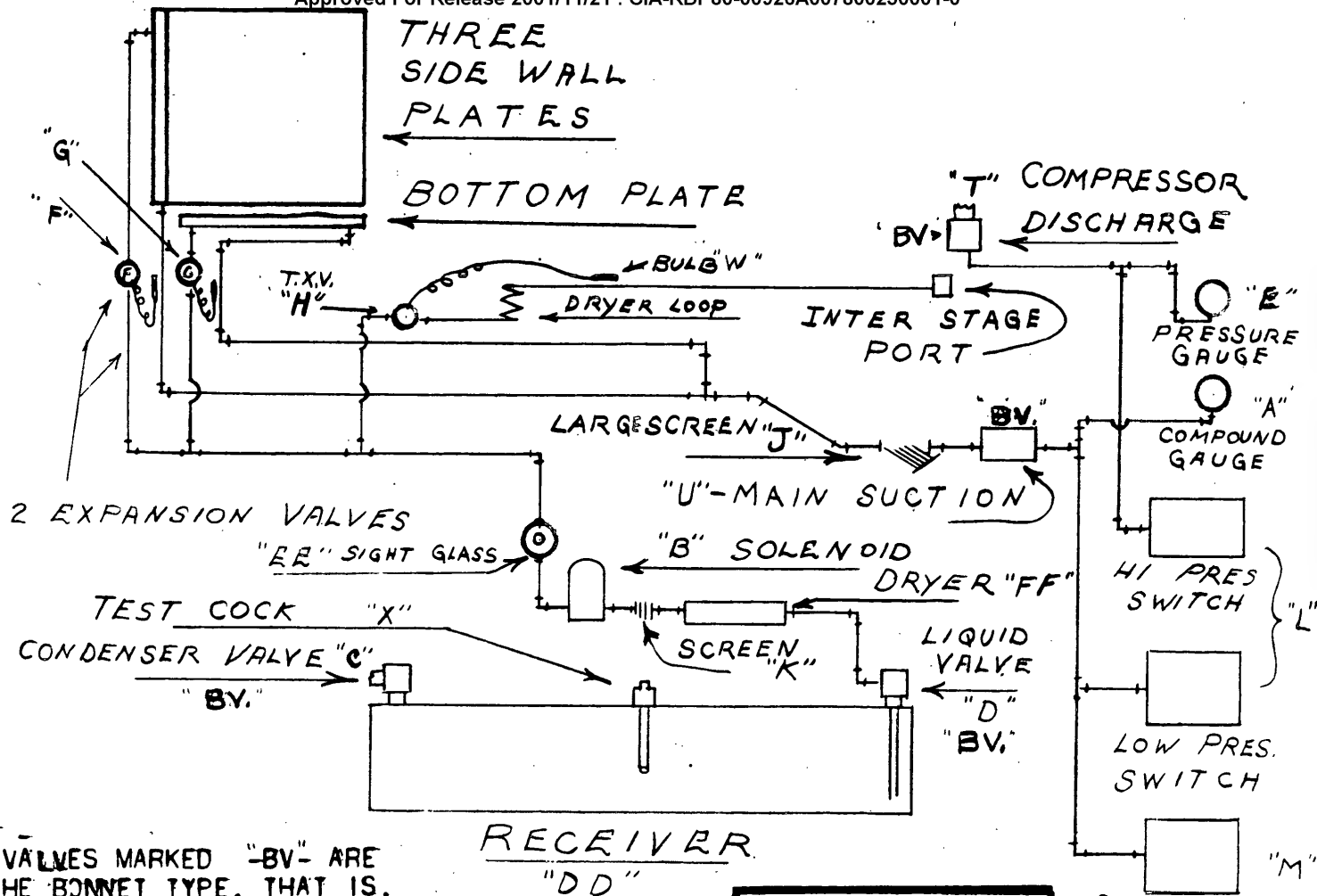


FIGURE 1

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0





NOTE - ALL VALVES MARKED "BV" ARE OF THE BONNET TYPE. THAT IS, THE BONNET, OR PROTECTIVE COVER MUST BE REMOVED IN ORDER TO CLOSE OR OPEN THE VALVE, AND REPLACE. THESE ARE VALVES C, D, T AND U.

FIGURE 2

GAS CIRCUIT

ATLAS ELECTRIC DEVICES CO.

CHICAGO, ILL.

2

DWG. No. FC 43

POWER 27.22

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

CLARK RELAY # 7303

COIL - T13.84-4 COIL

220 VOLTS
A007800250001-0
3 PH. 50 CY.

110V
50Hz

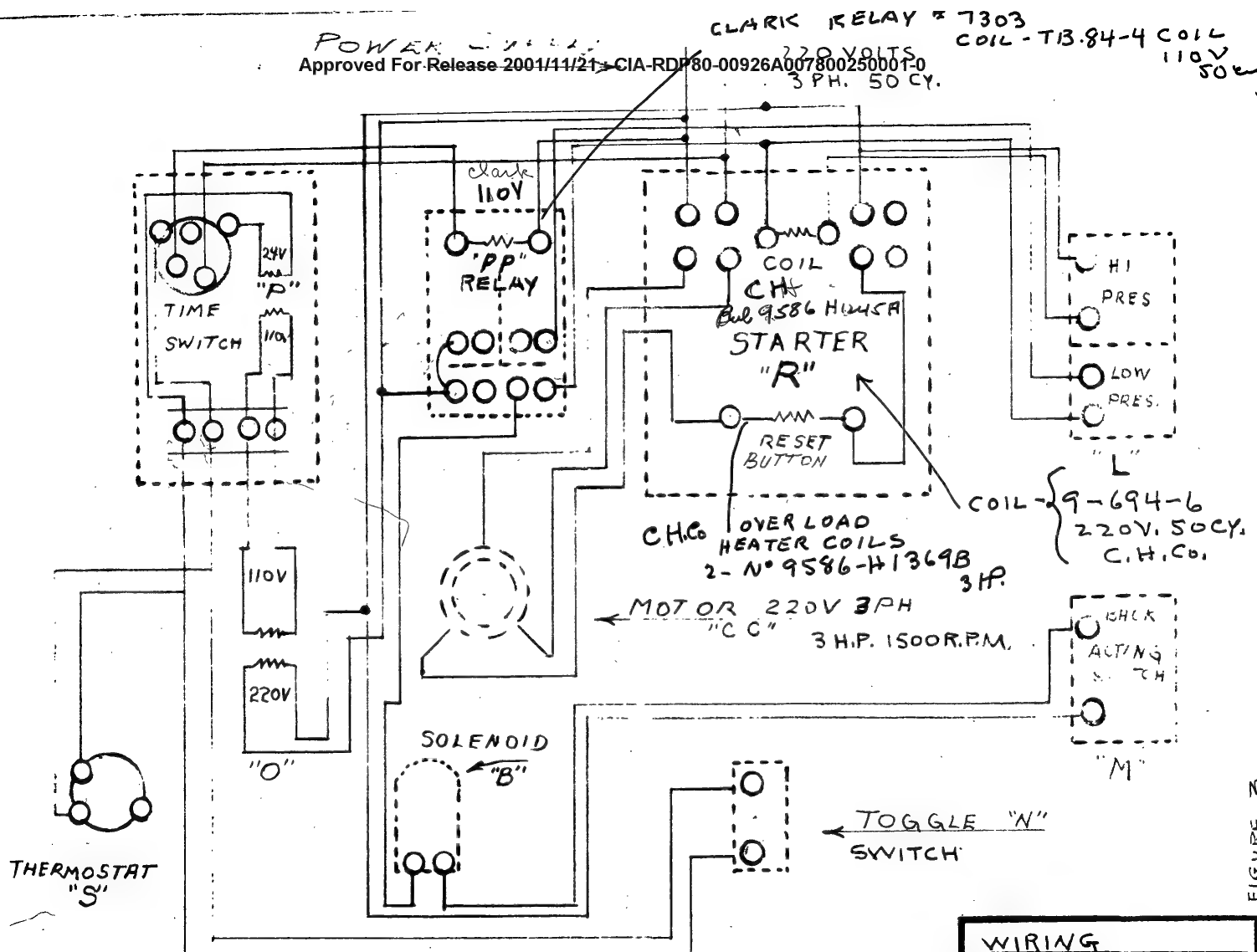


FIGURE 3

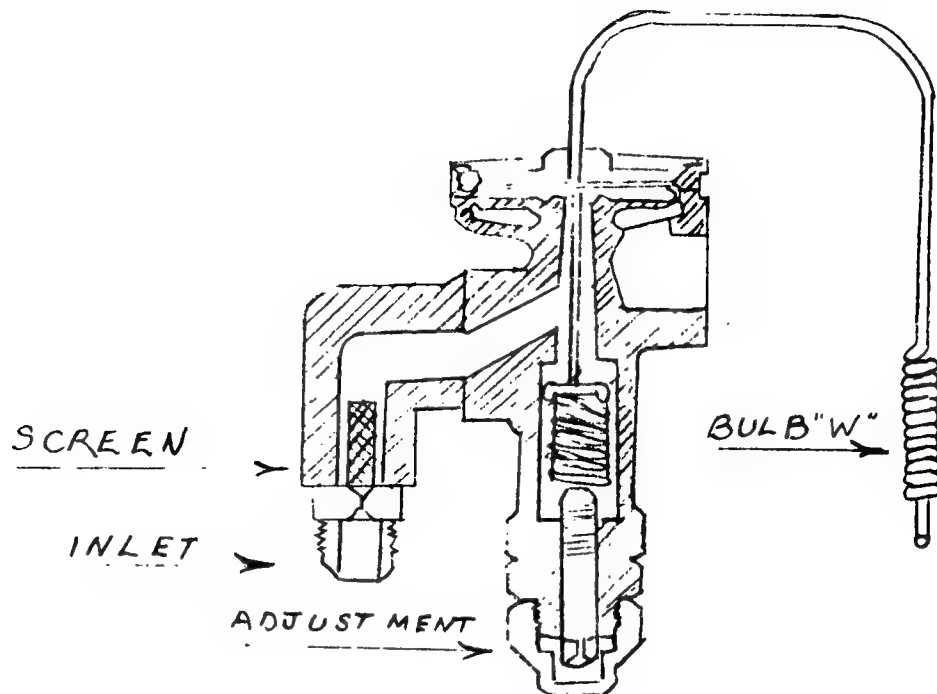
1917, C. F. and C. S. Controller Co.

B-000, 1303, 115V, 50Hz.

Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0

FIGURE 3

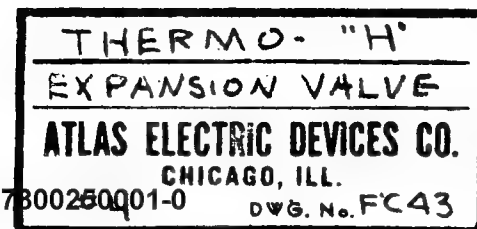
WIRING
DIAGRAM
ATLAS ELECTRIC DEVICES CO.
CHICAGO, ILL.
#3 DWG. No. FC.43

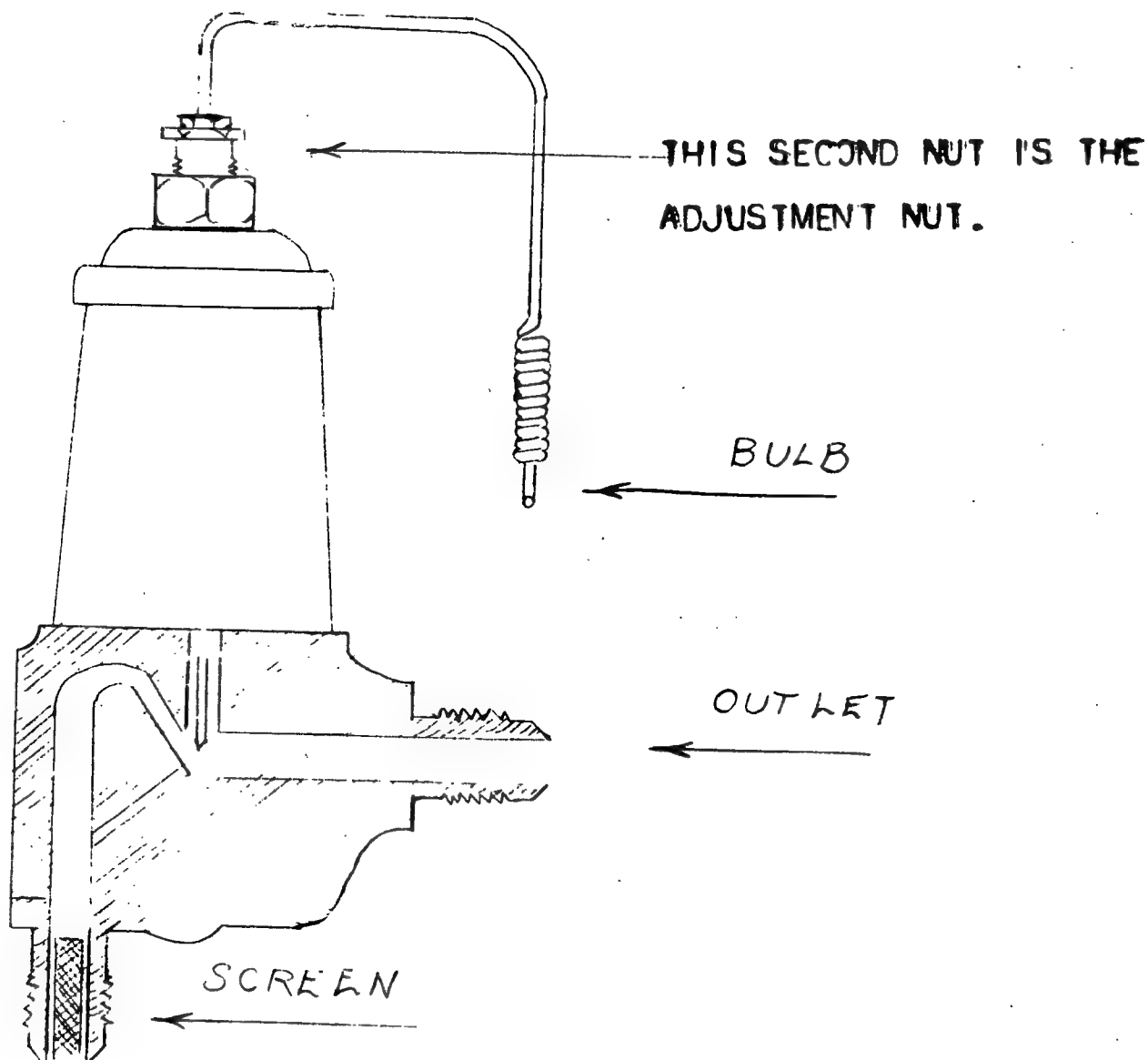


THERMOSTATIC EXPANSION VALVE "H"

THE ADJUSTMENT OF THIS TYPE VALVE IS FOUND UNDER THE CAP ON THE BOTTOM OF THE VALVE BODY. TO OPEN THIS VALVE TURN THE ADJUSTMENT STEM OUT OR TO THE LEFT. TO CLOSE THE VALVE, TURN THE STEM IN OR TO THE RIGHT. MOST VALVES HAVE A SCREEN IN THE INLET OF THE BODY. THIS SCREEN IS HELD IN PLACE BY THE INLET FITTING.

WHEN ADJUSTING A VALVE, MAKE NO MORE THAN ONE HALF (1/2) TURN AT A TIME AND ALLOW 15 TO 30 MINUTES FOR VALVE TO ADJUST ITSELF BEFORE MAKING ANOTHER ONE HALF (1/2) TURN.



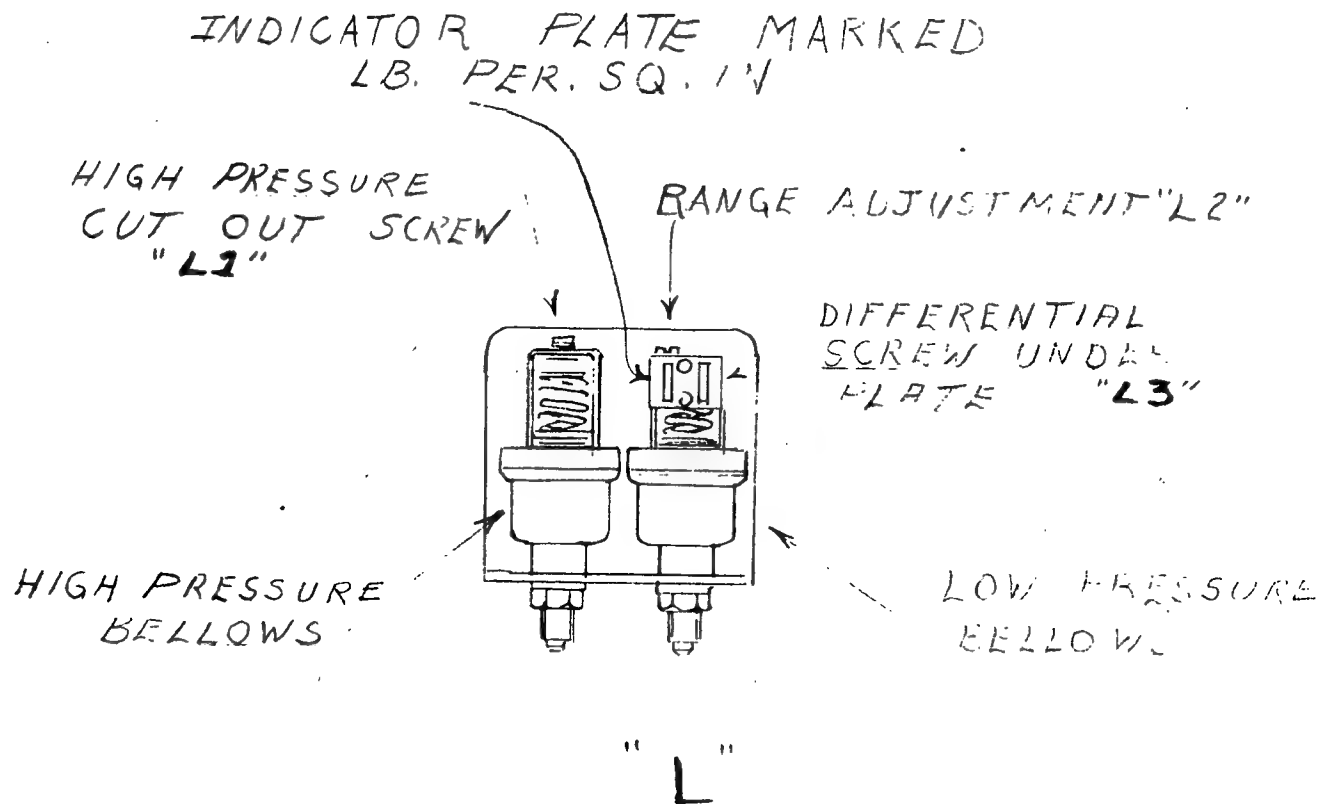


THERMOSTATIC EXPANSION VALVES "F" & "G"



THE ADJUSTMENT OF THESE VALVES IS OBTAINED BY TURNING THE SECOND NUT ON TOP OF THE VALVE. THE LOWER NUT IS A PART OF THE VALVE BODY CAP. THE SECOND NUT IS THE ADJUSTMENT NUT AND THE THIRD IS A PACKING NUT THAT WILL ALLOW THE ADJUSTMENT NUT TO TURN WITHOUT TWISTING THE CAPILLARY LINE.

TO OPEN THE VALVE, THE NUT IS TURN IN OR TO THE RIGHT.
TO CLOSE THE VALVE, TURN TO THE LEFT, OR OUT.

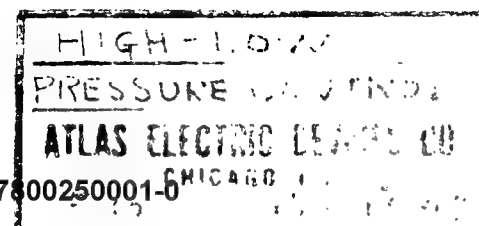
FIGURE 5

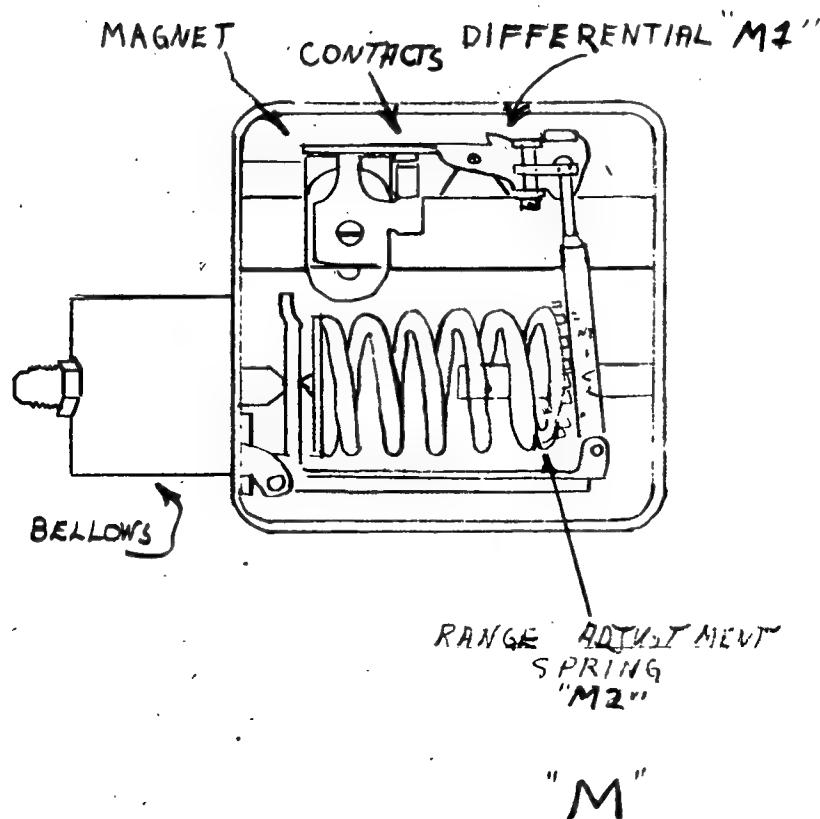


H I - L O W P R E S S U R E C O N T R O L

THE HIGH PRESSURE CONTROL IS SET WITH ABOUT 20 POUNDS DIFFERENTIAL AND CAN BE CHANGED TO BREAK CONTACT ANYWHERE FROM 80# to 300 #. ADJUSTMENT IS MADE BY TURNING THE LARGE SCREW "L-1" WHICH WORKS AGAINST THE BELLOWS SPRING. TURNING CLOCKWISE  WILL RAISE THE CUTTING OUT POINT. TURNING THE SCREW COUNTER-CLOCKWISE  WILL LOWER THE CUTTING OUT POINT. THE DIFFERENTIAL IS SET AS ABOVE NOTED AND MAY NOT BE CHANGED. IT IS NOT ILLUSTRATED HEREON.

THE LOW PRESSURE CONTROL HAS A DIFFERENTIAL ADJUSTMENT OF ABOUT 50 POUNDS RANGE. THE CUTTING IN POINT IS SET WITH THE LARGE SCREW "L-2" AS INDICATED BY ARROW AND CHANGING THE DIFFERENTIAL "L-3" WILL DETERMINE THE CUTTING OUT POINT AS INDICATED BY THE POINTER. ALL POUNDS SHOWN ON BOTH HIGH PRESSURE AND LOW PRESSURE CONTROL ARE IN POUNDS PER SQUARE INCH. THE CONTROL IS SET FOR CUTTING IN AT 5 POUNDS, AND CUTTING OUT AT 16 INCHES OF VACUUM. THIS CONTROL WILL NOT AFFECT TEMPERATURE. IT IS USED ONLY TO PUMP THE MACHINE DOWN BETWEEN CYCLES AND SHUT DOWN PERIODS.





BACK ACTING SWITCH "M"

THIS IS A PENN BACK-ACTING SWITCH WHICH BREAKS CONTACT AT 10 INCHES. IT MAKES CONTACT ON A DROP IN PRESSURE AT 21 INCHES OF VACUUM.

CUTTING OUT ADJUSTMENT IS CHANGED BY TURNING THE SMALL SCREW "M-1" ON THE CONTACTOR ARM THAT IS HOOKED TO THE BAKELITE PUSH ROD "M-3".


CUTTING IN POINT IS CHANGED BY ROTATING THE LARGE SPRING THAT WORKS AGAINST THE BELLOWS PIN. THE CUTTING IN POINT IS LOWERED BY ROTATING THE LARGE SPRING "M-2" IN A COUNTER-CLOCKWISE DIRECTION.

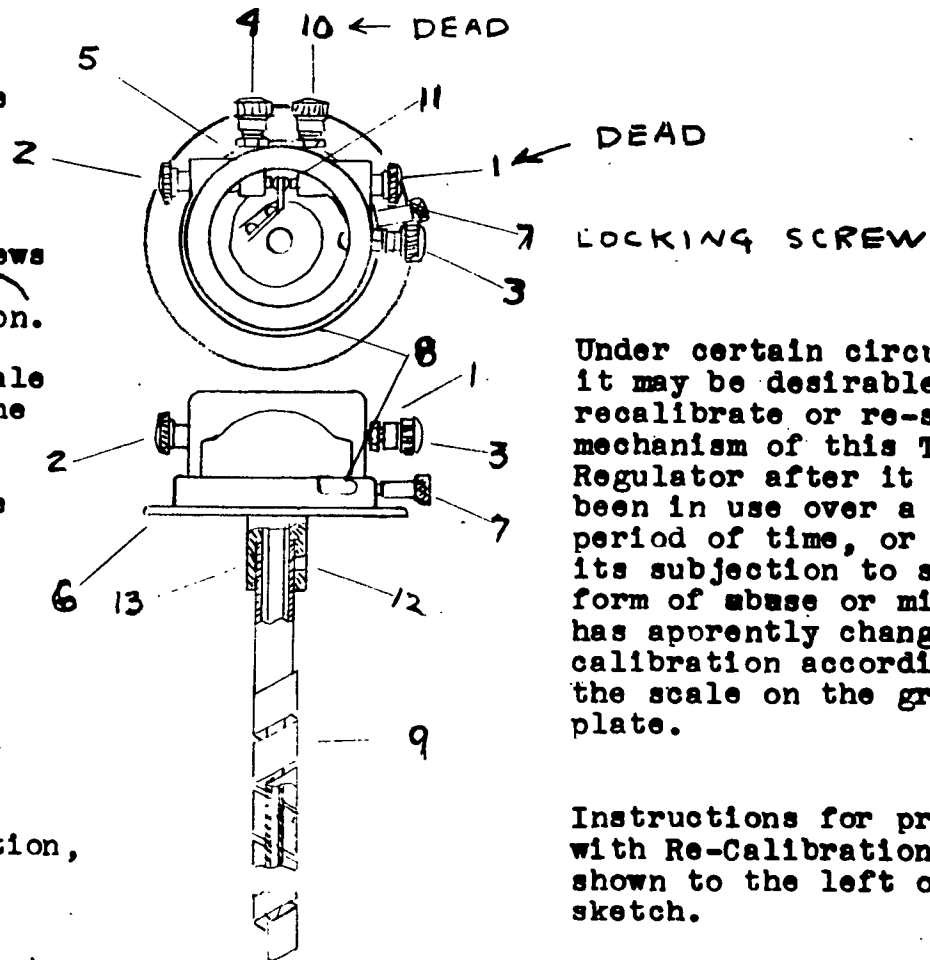
ROTATING THE LARGE SPRING "M-2" CLOCKWISE WILL RAISE THE CUTTING IN.

FIGURE 7



RECALIBRATION
of this Thermo-Regulator is accomplished in the following manner:-

1. Submerge the bimetallic strip completely in some medium, the temperature of which may be known or measured.
2. Turn both adjusting screws Counter-clockwise  to their initial position.
3. Set pointer 8 on the scale to the temperature of the calibrating medium by loosening the locking screw 7 and rotating the thermo-regulator head to the proper point.
4. Lock head in place.
5. Loosen screw 12 and rotate the element-fastening sleeve 13 to the correct position so that the contact arm is in an intermediate position, i.e., without touching either contact.
6. Make sure that the contact buttons on the arm will strike the center of the contacts on the adjusting screws after final adjustment. If they need raising or lowering, this may be adjusted by sliding the sleeve upward or downward before locking the set screw 12.
7. At this point, lock the sleeve again with the locking screws 12 whereupon the Thermo-Regulator will be calibrated according to the scale.

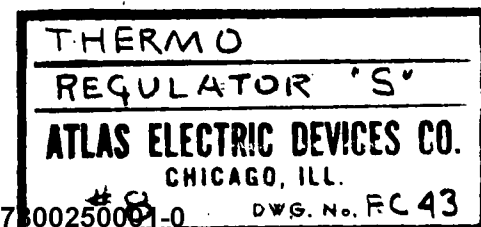


Under certain circumstances it may be desirable to recalibrate or re-set the mechanism of this Thermo-Regulator after it has been in use over a long period of time, or after its subjection to some form of abuse or misuse has apparently changed its calibration according to the scale on the graduated plate.

Instructions for proceeding with Re-Calibration are shown to the left of the sketch.

THERMO-REGULATOR "S"

FIGURE 8



TABLE

NORMAL OPERATING HEAD PRESSURES AT CORRESPONDING SUCTION PRESSURES

When the Room Temperature is	2 0" t o 1 0" SUCTION PRESSURE 0# to 10# HEAD PRESSURE	HEAD PRESSURE
16° C	135-165	160-185
21° C	145-175	165-190
24° C	155-185	175-200
27° C	165-195	185-210
30° C	175-205	195-220
33° C	185-215	210-240
35° C	200-225	230-255
38° C	215-240	245-270

FIGURE 9

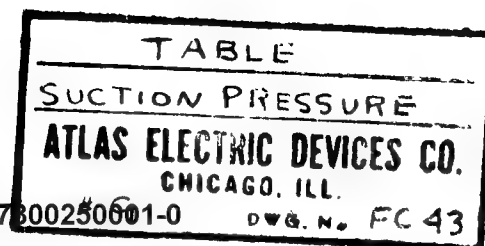
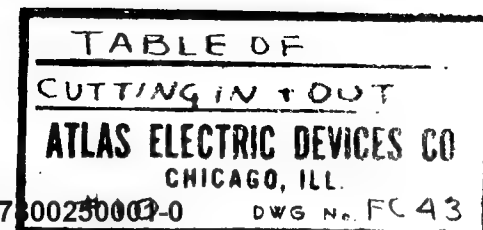


TABLE OF CUTTING-IN AND CUTTING-OUT VALUES

The use of Freon Refrigerant "22" permits
the following inches of Vacuum at the
various degrees shown in Centigrade:-

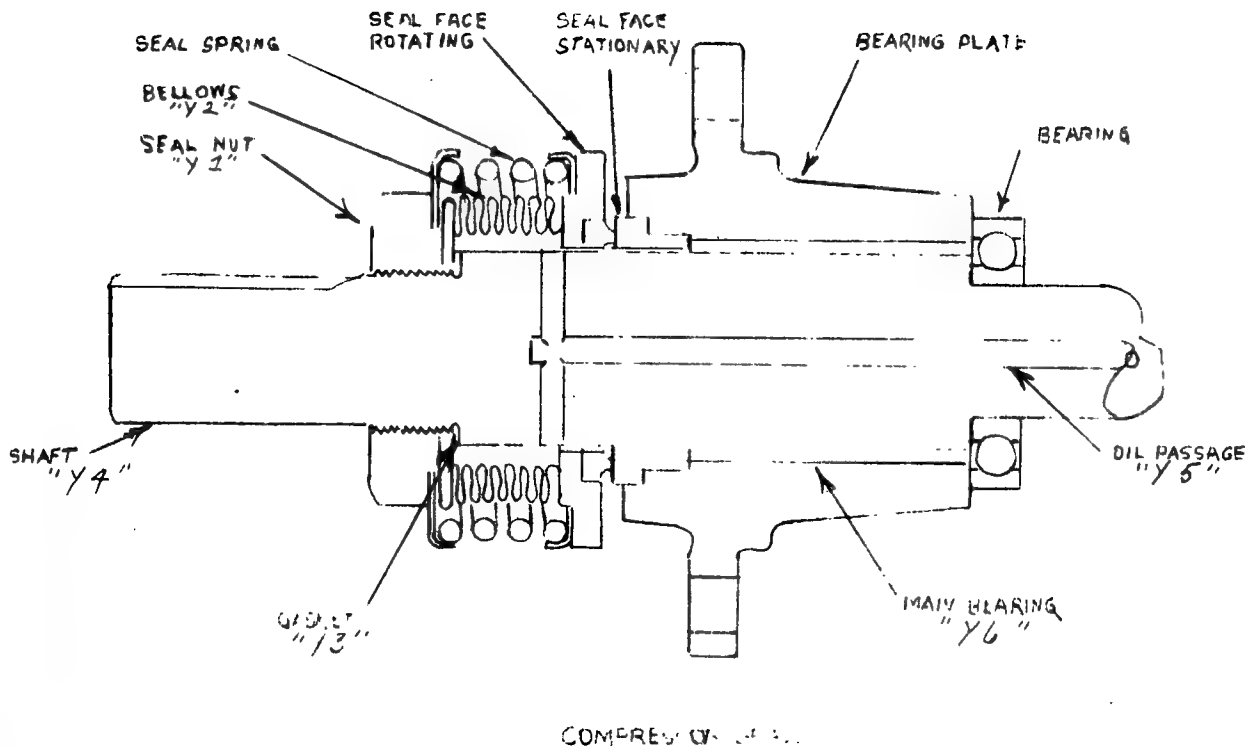
CABINET TEMPERATURE		MUST HAVE THE FOLLOWING INCHES OF	
AT		VACUUM	
<u>MINUS</u>	<u>C</u>	<u>CUT-IN</u>	<u>CUT-OUT</u>
51		6"	18½"
54		9"	20 "
57		12"	21½"
60		14	23

FIGURE 10



CRANKCASE SEAL ASSEMBLY

FIGURE 11.

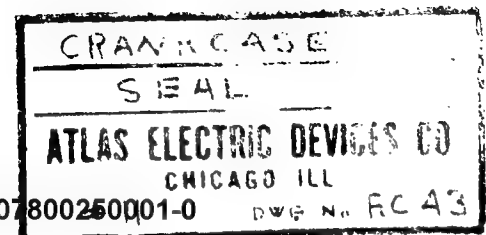


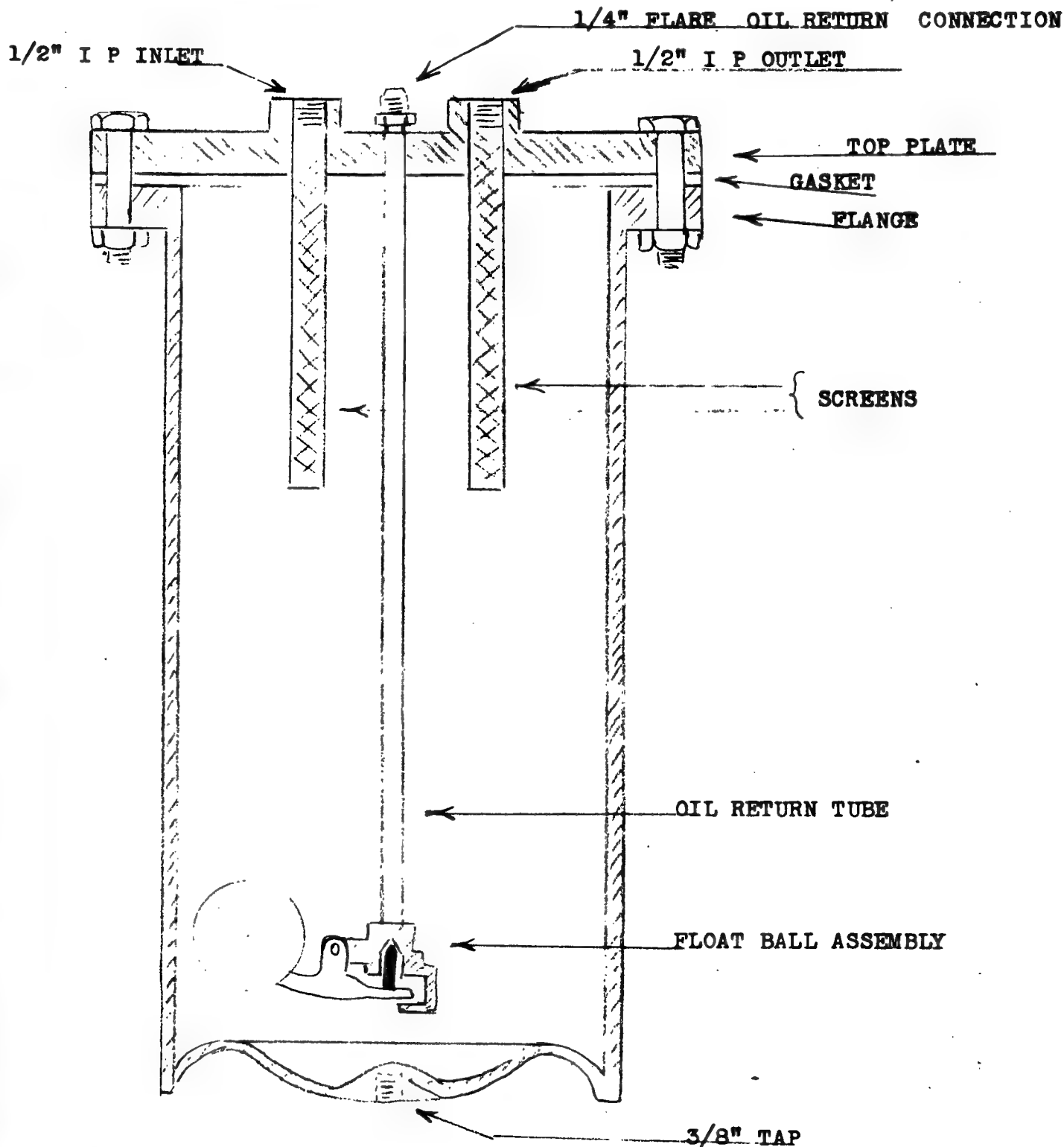
SEAL "Y"

THE SEAL BELLOWS Y-2 IS SECURED TO THE SHAFT WITH A SEAL NUT Y-1 WITH A SOFT COPPER GASKET Y-3 BETWEEN THE REAR PLATE OF THE BELLOWS AND THE SHAFT Y-4 SHOULDER. A HOLE Y-5 IS DRILLED THROUGH THE SHAFT UNDER THE SEAL BELLOWS FURNISHING OIL FROM THE OIL PUMP TO THE INSIDE OF THE SEAL. THE OIL THEN PASSES THROUGH THE GROOVES OF THE MAIN BEARING Y-6 IN THE FRONT BEARING BACK TO THE CRANK CASE HOUSING.

SEALS CAN BE LAPPED SMOOTH IN THE FIELD ON A PLATE OF GLASS USING PUMICE STONE AND OIL ON THE BRASS FACE. THE STEEL FACE OF THE BEARING PLATE CAN BE LAPPED WITH FINE STEEL LAPPING COMPOUND AND THEN FINISHED WITH PUMICE STONE. DO NOT USE COMPOUND ON BRASS FACE. USE ONLY PUMICE STONE AND OIL ON BRASS.

FIGURE 11





OIL SEPARATOR "U U"

Temp-Rite Oil Separator Size 3 with 1/2" Iron Pipe Inlet and Outlet with Oil Return Line 1/4".

OBJECT:- To separate Oil Vapor from Gas Vapor under high pressure. The two screens break up the Oil Vapor causing same to settle in bottom of chamber. The oil is returned to compressor Crank Case through a Float Valve. The refrigerant gas passes into the condensor.

OIL SEPARATOR

U. U.

ATLAS ELECTRIC DEVICES CO.
CHICAGO, ILL.

CWJ File

UNCLASSIFIED

INSTRUCTIONS

For the Installation and Operation

of the

FREEZING CABINET

FOR MINUS 60° C OPERATION

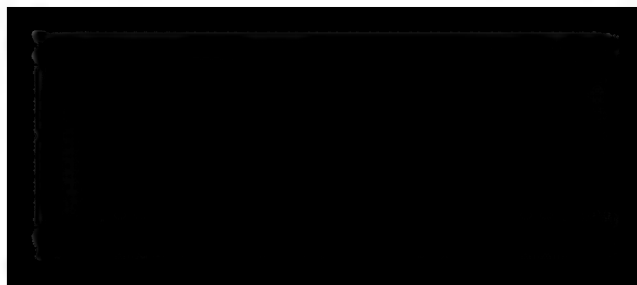
Type FC-DR

Serial No. SPA-417

Voltage 220

Cycles 50

STATINTL



Sole Manufacturers
ATLAS ELECTRIC DEVICES CO.
INCORPORATED
CHICAGO, ILLINOIS, U. S. A.

UNCLASSIFIED

FADE-OMETER

WEATHER-OMETER

LAUNDER-OMETER

D A T A
and
G E N E R A L I N F O R M A T I O N
on

ATLAS TYPE FC-DR REFRIGERATING UNIT NUMBER SPA 417

designed for
MINUS 60° C DUTY

Electrical Rating 220 Volts 3 Phase 50 Cycles
Alternating Current

PURCHASED ON YOUR ORDER 11-56/L-420534 DA-TPS-20861

Manufactured and Tested by
ATLAS ELECTRIC DEVICES COMPANY
361 W. Superior St.,
Chicago, Ills.

INDEX BY TITLES TO ALL
GENERAL INFORMATION AND TECHNICAL DATA
OF
FC-DR REFRIGERATING UNIT

SPA-417

*	*	*	*	*	*	*	*
SECTION	PAGE	TITLE					
1	1 and 2	THE CYCLE OF OPERATION OF A TWO STAGE COMPRESSOR					
2	3	LIQUID LEVEL TEST COCK "X"					
3	3	COMPRESSOR OIL PUMP "Z"					
4	4	SHAFT SEAL "Y"					
5	4	TESTING DISCHARGE VALVES OF COMPRESSOR					
6	5	COMPRESSOR OIL "HH"					
7	5	MOISTURE IN SYSTEM					
8	5 and 6	DRYER OR DEHYDRATOR					
9	6 and 7	REMOVING AIR					
10	7	HIGH HEAD PRESSURE					
11	7 and 8	ELECTRIC DRIVE MOTOR					
12	8	DEFROSTING THE CABINET					
13	8 and 9	COMPRESSOR FAILURE					
14	9	OIL FILLER PLUG "V"					
15	9	LEAK TEST FOR FREON "22"					
16	9 and 10	EXPANSION VALVES "F", "G" AND "H"					
17	10	PUMPING DOWN THE SYSTEM					
18	10	SHUTTING DOWN THE MACHINE					
19	11	SERVICE VALVES "C", "D", "T" AND "U"					
20	12	LIQUID LINE SIGHT GLASS "EE"					
21	12	GAUGES "A" and "E"					
22	12 and 13	SCREENS "F", "G", "H", "K" and "J"					
23	13	EXTRA SUPPLY OF FREON GAS AND DRUMS					
24	13 and 14	BACK ACTING SWITCH "M"					
25	14	HIGH PRESSURE-LOW PRESSURE CONTROL "L"					
26	15	OIL SEPARATOR "UU"					
27	16, 17, 18 & 19	FOXBORO REGULATOR					
28	19	MOTOR STARTER "R"					
29	19 and 20	BOX CONSTRUCTION					
30	20	SERVEL COMPRESSOR					
31	21, 22, 23	STARTING THE UNIT					
32	24, 25	SERVICE ANALYSIS					
	25		* No Refrigeration				
	25		* Insufficient Refrigeration				
	25		* Recommended Service Operations				
			-Leak Testing				
	26		-Discharging Ref. from System				
	26, 27		-Charging Refrigerant				
	27		-Purging Air from System				
	28		-Servicing Valves				
	28, 29		-Changing Valve Plate				
	29	FREON GAS "22"					

GLOSSARY OF PARTS AND SYMBOLS AS NOTED
in attached instructions

<u>Mentioned in Section No.</u>	<u>Marked</u>	<u>Description</u>	<u>Refers to Figure</u>
13,18,21	A	COMPOUND GAUGE	2
18,	B	SOLENOID VALVE	2
19,27,29	C	CONDENSOR INLET VALVE	2
19,27,29	D	LIQUID OUTLET VALVE	2
21	E	HI PRESSURE GAUGE	2
16,21,22,27,29	F	EXPANSION VALVE with SCREEN	2 and 5
16,21,22,27,29	G	EXPANSION VALVE with SCREEN	2 and 5
16,21,22,27,29	H	EXPANSION VALVE with SCREEN	2 and 5
22	I	LARGE SCREEN	2
20,22,29	K	SCREEN	2
25,27	L	HI-LOW PRESSURE CONTROL	3
24,27	M	BACK ACTING SWITCH	3 and 7
12,13,17,18,27	N	TOGGLE SWITCH	3
27,	O	TRANSFORMER 220-110 Volts	3
27	P	TRANSFORMER 110-24 VOLTS	3
13	R	MOTOR STARTER <i>Cutler Hammer Bul 9586</i>	3 H, 4, 5, 6
27	S	THERMO REGULATOR (THERMOSTAT)	3 and 8
9,19,27	T	DISCHARGE SERVICE VALVE	1
5,13,19,21,22,27,29	U	SUCTION SERVICE VALVE	1
14	V	OIL FILLER PLUG	1
1	W	BULB	2
2,9	X	LIQUID LEVEL COCK	2
3,4,29	Y	SHAFT SEAL	11
3	Z	COMPRESSOR OIL PUMP GAUGE	1
29	AA	VALVE PLATE (LOCATION)	1
9,19,23	BB	1/8" PORTS	1
11	CC	ELECTRIC MOTOR	3
2	DD	RECEIVER	2
20	EE	LIQUID SIGHT GLASS	2
7,8,20,29	FF	DRYER or DEHYDRATOR	2
27	GG	OIL SIGHT GLASS	1
3,6,29	HH	COMPRESSOR OIL	none
11,29	JJ	ALEMITE GUN	none
11,29	KK	ALEMITE FITTINGS	none
29	LL	HOLDING COIL & HEATING ELEMENTS FOR MOTOR STARTER "R"	none
8	MM	SILICA GEL	none
8	NN	FUNNEL	none
27,11	OO	GREASE FOR MOTOR	none
	PP	RELAY-Clark-Bul 7030 Control,	3
1,15,23	RR	DRUMS WITH REFRIGERATING GAS	none
23,	SS	FITTINGS FOR FREON DRUMS	none
27	TT	BELTS	none
15	UU	OIL SEPARATOR	12

LIST OF SUPPLIES FURNISHED

WITH FC DR REFRIGERATING UNIT SPA 417 MINUS 60°C

These parts are identified with the initials or numbers or both initial and number, and the following will serve to assist in determining the replacement for which we furnish such spare part:-

Package marked	Is for replacement of	Further Data
"B" Extra	Solenoid Valve "B"	Model 73 R J, w/ 7/32" Orifice Device #30840, Inlet 3/8" IPS Outlet 3/8" IPS 115 Volt 60 Cycle Automatic Products Co-Milwaukee.
"F"	Expansion Valve "F"	Detroit Thermostatic Expansion Valve No. 673 (2249) 3/8" Inlet, Freon - 5/32" Orifice 1/2" Outlet SAE, Max Press.15#,Length 40"
"G"	Expansion Valve "G"	Same as for "F")all 4 furnished
"H"	Expansion Valve "H"	Same as for "F")are interchangeable with each other for replacement.
"K"	Screen "K"	Trapit Model 408 Type C3, 3/8" SAE Male Flare, made by the Automatic Products Co.Milwaukee.
"Y"	Shaft Seal "Y"	2 Servel Seal Assembly, with Servel Plate Assembly, and with 2 Springs 241-142, 2 Gaskets 28-48, and 2 Gaskets R-3307.
"AA"		2 each Gaskets 247-245, 247-305, and 247-284 for Valve Plate.
"FF"	Davison Dryer "FF"	Mueller Brass Co., Dehydrator A-13961 for Silica Gel, with 3/8" Flare. (Port Huron, Michigan.)
"HH"	Argon Oil Special	Specially refined by the S O Co for Servel for Low Temperature Units such as this.
"JJ"		Alemite Gun for Greasing Motor
"KK"		Alemite Fittings for Alemite Gun
"LL"	MOTOR STARTER "L"	2 sets of Heating Elements, and 1 Holding Coil for Motor Starter.
"MM"	SILICA GEL	5 Lbs. Murphy&Irwin-Milwaukee.
"NN"		Funnel for use with Silica Gel.
"OO"		1 Lb. Pullman Fibre Grease.
"RR"	FREON GAS "22"	3 DRUMS Freon Gas "22"
"SS"	Belts	for Freon Gas Drums
"TT"		for Motor-Compressor Drive.

LIST OF SUPPLIES FURNISHED (continued) (PAGE (2))WITH FC DR REFRIGERATING UNIT SPA 417 for MINUS 60° C

<u>Package Marked</u>	<u>Is for replacement of</u>	<u>Further Data</u>
"VV"	TRAYS FOR SEMI LIQUIDS FOR TESTING PURPOSES	Manufactured by Atlas Electric Devices Co.
"WW"	TRAYS FOR PANELS FOR TESTING PURPOSES	Manufactured by Atlas Electric Devices Co.
"XX"	FOXOBORO REGULATOR, is detached from the cabinet proper, so as to protect it in shipment to destination.	Manufactured by Foxoboro Mfg. Co.
"YY"	CHARTS NO. 79308, to be used in the above Foxoboro Regulator. These are printed up in ratings graduated from 120-0-60 all Centigrade.	Manufactured by Foxoboro Mfg. Co.
"ZZ"	Ink, Key, Set for Recorder	Manufactured by Foxoboro Mfg. Co.
"AAA"	Bonnet Wrench, with Adapter to be used for tightening and loosening various bolts around the compressor and machine.	Furnished by the Atlas Electric Devices Co.
"BBB"	Drip Pan, with Base, attached to rear of cabinet for acceptance of moisture after degroting, and oil drips	Manufactured by Atlas Electric Devices Co.

*Item PP is a Clark Controller mfg by Cleveland
Bulletin 7303 - Per WW Mackey*

LIST OF EXHIBITS ATTACHED
DRAWINGS

<u>Figure</u>	<u>Description</u>	<u>Marked with Data</u>
1	Shows a diagrametic sketch of the compressor unit assembly in the lower compartment of the Freezing Unit.	FC-43
2	Shows the Inter-relationship of various Valves Switches, and control, their location as compared to each other, and their identification in the General Information Section, Starting the Unit Section, and Service Analysis	Gas Circuit
3	Shows the Wiring from Power Supply through the various Controls	Wiring Diagram
4	Shows a Diagramatic Sketch of Expansion Valve "H"	Thermo "H" Expansion Valve
5	Shows a Diagramatic Cross Section Sketch of Expansion Valves "F" and "G"	"F" and "G" Expansion Valves
6	Shows a Diagramatic Sketch of Hi-Low Pressure Control	Hi-Low Pressure Control
7	Diagramatic Sketch of Back Acting Switch "M"	Back-Acting "M"
8	Shows a Diagramatic Sketch of Thermostat "S"	Thermo-Regulator "S"
9	Shows a Table of Normal Operating Head Pressures at Corresponding Suction Pressures	Table-Suction Pressure
10	Table of Cutting In and Cutting Out Values	Table of Cutting In and Out
11	Shows the Crank Case Seal Assembly	Crank Case Seal
12	Diagrametic Sketch of Oil Separator "UU" with explanation of its function	Oil Separator "UU"
13	Servel, Inc., Service Manual describing all the parts for the Compressor operating the Unit SPA-417	Published by the Servel, Inc., Evansville, Ind. U.S.A.
14	Photostatic copy of the Chart, showing 48 hour operation continuous cycling at our premises April 4-5-6, 1943.	None

GENERAL INFORMATION

SECTION 1

THE CYCLE OF OPERATION OF A TWO STAGE COMPRESSOR

It is generally considered inadvisable to employ ordinary refrigerating compressors of the Single Stage type directly on evaporators involving temperatures below Minus 40° C, using Freon 22 as the refrigerant.

At minus 40°C, the refrigerant pressure in the evaporator is approximately 0 pounds pressure per square inch. Assuming a 165 pound to 190 pound gauge head pressure, would mean a compression ratio of 15 to 1. By splitting the compression into two steps, compression can be held to 5 or 6 to 1 in each step, and thus obtain high efficiency in compression and over-all performance.

The suction gas from the evaporator is fed to the main suction of the compressor, and is compressed by three (3) pistons, thus raising the pressure of the gas from the low vacuum of 17 to 22 inches to approximately 5 pounds per square inch.

After being compressed in the three cylinders of the first stage, it passes through the respective discharge valves and is then fed into the suction side of the one cylinder of the second stage, where it is recompressed from 5 pounds to 165 to 190 pounds. This action is possible because the suction gas from the main evaporator at 20 inches vacuum is so rarified that three cylinders even at 5 pounds discharge will not supply sufficient volume to feed the one second stage cylinder.

Obviously for Minus 60°C operation, this same engineering was advisable.

GENERAL INFORMATION

SECTION 1 (continued)

THE INTER-STAGE OR SECOND STAGE

The interstage is made up of as an auxiliary evaporator operated in multiple with the main evaporator, and with a separate expansion Valve "H" but with its suction feeding into the interstage instead of the main suction. This evaporator is only for the purpose of cooling the second stage cylinder.

After the suction gas from the main suction has passed through the first stage, and is compressed, it becomes relatively hot due to the heat of compression and if it were fed directly at this high temperature into the single cylinder of the second stage, it would have a tendency to burn up the valves, and decrease the over-all efficiency.

The expansion valve of the second stage should be nearly closed, When the machine is started up, it will be found that the interstage pressure will be about 30 pounds gauge. But when the low temperature is reached the pressure will vary from one (1) pound to Twelve (12) pounds. It is desirable to have a cool suction line into the second stage but not a frosted line. The frost should taper off about six (6) inches from the location of the expansion valve Bulb. In the event that the valve should have to be changed, the new bulb "W" can be strapped in the suction line at this location instead of inserting the bulb in the line. Cut the old bulb line off approximately two (2) inches from the suction line and solder it closed.

GENERAL INFORMATIONSECTION 2LIQUID LEVEL TEST COCK "X"

The Receiver "DD" is equipped with a Liquid Level Test Cock "X", which is a small Purge Valve, with a 3/16" square key. To the Test Cock "X" is attached a small tube ending about 1/3 way up in the Receiver "DD". If the liquid refrigerant stands up to the end of this tube, it can be drawn off through the Test Cock "X". This is the normal reserve to be maintained in the receiver "DD". It should be checked with the machine in operation, at about the lowest suction pressure at which the system normally operates.

The liquid level will vary slightly with the suction pressure, being LOWEST at the lowest evaporator temperatures. In testing, "crack", or open slightly, the Test Cock "X", and if gas VAPOR emerges add refrigerant until test shows that the gas is in LIQUID state.

SECTION 3COMPRESSOR OIL PUMP "Z" Figure 1

The amount of oil pressure will depend on the suction pressure in the crank case and on the temperature of the oil. The oil will have a HIGHER PRESSURE at higher crank case pressure; and LOWER PRESSURE at low crank case pressure. For example, at a crank case pressure which is read on the compound gauge on the front panel of 0 pounds the gauge on the oil pump may read 50 to 60 pounds. At a suction pressure of 20 inches, the oil pump gauge should read at least 15 pounds (15 lb. pressure above 0# plus 10 lb. below 0#), so that the actual oil pressure should read approximately 25 pounds. A positive oil pressure is necessary to maintain adequate lubrication of the bearings, and also proper lubrication and COOLING OF THE SEAL "Y". (Refer to Figure 11)

GENERAL INFORMATION

SECTION 4

SHAFT SEAL "Y"

The seal bellows is secured to the shaft with a Seal Nut "Y-1" with a soft copper gasket "Y-3" between the rear plate of the bellows "Y-2" and the shaft "Y-4" shoulder. There is a hole/drilled in the shaft under the seal bellows that furnishes oil from the oil pump to the inside of the seal. The oil then passes through the grooves of the main bearing "Y-6" in the front gearing back to the crank case housing.

Seals can be lapped smooth in the field on a plate of glass using pumice stone and oil on the brass face. The steel face of the Bearing Plate can be lapped with the fine steel lapping compound and then finished with pumice stone.

CAUTION Be sure parts are cleaned after lapping. DO NOT USE COMPOUND ON BRASS FACE. Use only pumice stone and oil on brass. Make sure the Oil Ports in the shaft are clean.

SECTION 5

TESTING DISCHARGE VALVES OF COMPRESSOR.

To test discharge valves, run machine down on a vacuum and close the main suction Valve "U". A rapid rise in pressure in the crank case indicates that one or more of the first stage of discharge is leaking pressure back from the second stage. A slow rise is normal due to the second stage high pressure leaking back by the piston.

GENERAL INFORMATIONSECTION 6COMPRESSOR OIL "HH"

At the time of shipment, the unit is filled with the proper amount of oil, which is approximately 10 pints. It is of special characteristics, and for that reason an extra supply of 5 Gallons is furnished in the supplies shipped with the machine. It has a viscosity of 320 rated at 37°C. Check the amount of oil in the unit when the machine is off. The correct amount is one half way up on the sight glass in the crank case. THIS OIL WILL ABSORB MOISTURE FROM THE AIR, consequently it is imperative that you keep in air tight container at all times. Further, it is naturally expected that the oil used should be Free Flowing at the low temperature for which this Freezing Cabinet Specifications call for, namely, Minus 60°C. The oil we furnished is of that type.

SECTION 7MOISTURE IN THE SYSTEM

Moisture in the system will cause the Valves to stick, and give an erratic action. Moisture will also cause the oil to de-wax and separate. Whenever it is necessary to change a Valve or have the system open for any length of time, Change the Dryer "FF".

SECTION 8DRYER - "FF"DAVISON N K

The Dryer "FF" is filled with Silica Gel "MM", and has the action of absorbing moisture as gas passes through it. The Dryer has screens at both ends, but one end has several small screens to stop fine particles of dirt or silica from passing into the system. BE SURE THAT DRYER IS PLACED WITH OUTLET IN THE RIGHT DIRECTION. Dryers are refillable, but care should be taken in keeping the unused portion of Silica-Gel from

GENERAL INFORMATION

SECTION 8 (continued)

DRYER "FF"

BEING EXPOSED TO THE AIR. A Funnel is furnished Marked "NN" for refilling the dryer.

In an emergency, one end of the Dryer can be capped and other hooked to a vacuum pump, and in this manner place the Dryer in an oven of not over 97°C, and leave to heat for at least four (4) hours. This is not good practise, however, as the Dryer will contain some oil that will burn and char, and this method will only net approximately 40% efficiency.

SECTION 9

REMOVING AIR

The presence of air in the system indicates moisture has been drawn in and is especially harmful. To remove air, turn machine off and "crack" (meaning opening slightly) the Discharge Service Valve "T", until the Head Pressure has dropped to normal. This may have to be done several times. The Discharge Service Valve "T" on the head of the compressor is of the Back-Seating Type. When the stem is all the way in, the line from the condenser to the compressor is closed. When the stem is backed all the way out, the valve is open to the condenser and closes the 1/8" Port "BB" in the valve. With the Valve Back-seated, the 1/8" Iron Pipe Plug can be removed. Now open the valve a little, and oil and air or gas will come out.

When purging air out of the system, oil and gas will also escape, but not enough oil will be lost to affect the machine, ~~but~~ enough gas may be lost to warrant replacing it. Check the Test Cock "X" mentioned in Section 2 for gas level. ~~Approved For Release 2001/11/21 : CIA-RDP80-00926A007800250001-0~~ The air will escape in Vapor Form, and

GENERAL INFORMATION

Section 9 (continued)

REMOVING AIR

not condense. The air will usually stay up in the condenser. When the system has air in it, the Head Pressure will be too high. (Refer to Figure 9 for values).

SECTION 10

HIGH HEAD PRESSURE

High Head Pressure does not always indicate air in the system. If the condenser is dirty, and the air restricted around the machine, the Head Pressure will rise above normal. When starting the machine up, the Head Pressure should drop to normal as per chart 9. The Head Pressure chart does not always hold true, and the machine might be 10 pounds over the temperature pressure chart due to conditions that are not visible to the eye.

SECTION 11

MOTOR

3 H P 220 Volt 50 Cycle U. S. Ball Bearing Drip Proof Type

The motor is of the Air Cooled Drip Proof Type, and is rated at 220 Volts 50 Cycles 3 Phase Alternating Current. The Motor Starter "R" has a reset protection to prevent damage to the Motor "CC". The motor should be lubricated with the grease provided with the use of an Alemite Gun "JJ" after it has been in operation for approximately six months, as the motor is filled with grease when shipped from the factory. To lubricate the motor, the operator will notice that there are two 1/8" Iron Pip Plugs on each bearing housing. Insert the Alemite fittings "KK" in the upper hole, and remove the plug from the lower hole. Apply the grease pressure until grease shows in the open plug. Do not add grease without removing the

GENERAL INFORMATION

Section 11 (continued)

MOTOR

second plug as grease would then be forced into the bearing sleeve, and damage the inside of the motor. Also too much grease in the bearing housing will cause overheating of the motor, and subsequent damage.

SECTION 12

DEFROSTING THE CABINET

Defrosting the cabinet is done in two ways. One is to scrape the surplus frost from the cabinet walls with a wide putty knife. SCRAPE ---- DO NOT PICK, OR HAMMER OFF, THE FROSTING. The other way that is more satisfactory but not as fast is to turn the machine off with the Toggle Switch "N" on the front panel, but leave the Main Power supply on. Door can be opened to hasten the defrosting. The machine will run in short cycles, and pump down, but no refrigeration will take effect.

SECTION 13

COMPRESSOR FAILURE

In the event the unit is electrically energized, and no refrigeration is taking effect, a serious condition may result. We suggest calling in your maintenance man. Some times the back pressure due to some difficulty will rise about 25 pounds. In that case the compressor will stall and throw the reset button of the Motor Starter "R". To remedy this, the Main Suction Service Valve "U" should be closed tight, and the reset pushed in so that the crank case will free itself of gas. After several starts, the crank case will drop down to a vacuum and pump will run free again.

GENERAL INFORMATION

SECTION 13 (CONTINUED)

COMPRESSOR FAILURE

While doing this be sure the toggle switch "N" on the Front of Control Panel is in an "Off" position. After the crank case is free, open the suction line very slowly, until the low side coil has been cleared of high pressure gas as shown on Compound Gauge "A". Now the Toggle Switch "N" may be turned on again.

The reason the machine stalls is that the compressor is designed to handle the rarified gas and if suction pressure is too high, it crowds the second Stage of Compression.

SECTION 14

OIL FILLER PLUG

Do not tighten Oil Filler Plug "V" too tight. Use some form of sealing compound, such as Glycerin Litharge on the threads as a sealer.

SECTION 15

LEAK TEST FOR FREON 22

The leak test for Freon 22 is done with any good testing torch, such as the Halide, for instance. The manufacturer of such torch will provide information as to means to test for leaks. Generally oil around a fitting or bolt is a very good indication, BUT DO NOT RELY ON OIL AROUND THE BOLT OR FITTING TO INDICATE SUCH A LEAK.

SECTION 16

EXPANSION VALVES "F" "G" "H"

All expansion valves are factory set and should not be adjusted until the

GENERAL INFORMATION

SECTION 16 (continued)

EXPANSION VALVES

valve has had time to adjust itself to the system. When adjusting, make only half a turn at a time on the adjustment. It sometimes takes from 20 to 30 minutes for one adjustment. Refer to Figures 2, 4, and 5.

SECTION 17

PUMPING DOWN THE SYSTEM

When the system is not to be used for several days, the Main Power Supply should be left on, and turn the Toggle Switch "N" off on the front control panel. The machine will pump down and shut off of its own accord. If the main power supply is turned off, the gas will expand when the cabinet warms up, and do some damage to the compressor or expansion valves.

SECTION 18

SHUTTING DOWN THE MACHINE

To shut down the system, either for moving from one location to another, or if desired not to use for some period of time, the method is to follow the PUMPING DOWN procedure outlined in Section 17. After the cabinet has defrosted and all the gas has been pumped into the Receiver, Turn Toggle Switch "N" on momentarily, which opens the solenoid "B" enough to show 0 to 5 pounds on the Suction Gauge "A". Now close all valves and disconnect the power.

GENERAL INFORMATIONSECTION 19SERVICE VALVES

All service valves are of the Bonnet Type. This means that there is a "bonnet" or protective cover, which must be removed in order to close or open the valve, and replace. There are four (4) Service Valves:-

1. MAIN SUCTION SERVICE VALVE "U", is located on the side of the compressor and the large suction line is flanged to it. This valve is of the Back Seating Type, and the 1/8" Iron Pipe Plug Port "BB" is closed if the valve stem is backed all the way out. This port is for charging gas to the system, and to install an extra gauge to check the system. Also the gas can be by-passed from the Head into the Low side through this port to raise the pressure for leak testing.
2. DISCHARGE SERVICE VALVE "T" is located on the side of the head of the compressor and connects to the condenser tube. This valve is of the Back Seating Type, and has an 1/8" Iron Pipe Port "BB" that can be removed, and connections made here to purge air off, or discharge the gas from the system into a tank, or by-pass to the Low Side.
3. ONE-WAY SHUT OFF VALVE "C" is at the inlet of the Receiver and connects to the outlet of condenser. Must be open whenever the machine is running.
4. ONE-WAY SHUT OFF VALVE "D" At the outlet of the Receiver connects the liquid line here and supplies the expansion valves with the liquid. This valve has a dip tube on the bottom that picks the gas off the bottom of the receiver. The system will not work unless the liquid gas is delivered to the expansion valves.

NOTE: VALVES "C" AND "D" appear alike, the difference being that Valve "C" has no dip tube, whereas "D" has a dip tube.

All Service Valves have a cap over stem to insure against leaks.

GENERAL INFORMATION

SECTION 20LIQUID LINE SIGHT GLASS "EE"

The Liquid Line Sight Glass "EE" is located in the Liquid side of the system beyond the Dryer "FF" and Screen "K" and Solenoid Valve "B". This glass will be solid with liquid and show no bubbles if system has plenty of gas, and the Dryer or Screen are not restricted and Solenoid is wide open. If the Dryer, Screen, or Solenoid Valve should restrict the line, the glass will show bubbles or foaming, or that the system is short of Freon 22.

SECTION 21GAUGES "A" AND "E"

The system is equipped with Two (2) Indicating Gauges:

1. A High Pressure Gauge "E" has a range from 0# to 300# and is connected with a small copper tube to the discharge service Valve "T" of Figure 1. This gauge will indicate the pressure on the condenser, receiver and Liquid line, and up to the orifice of the Expansion Valves "F", "G" and "H".
2. A Low Pressure Gauge "A" has a range from 30" to 100 pounds of vacuum and is connected with a small copper tube to the Main Suction Service Valve "U". This gauge will give the pressure reading from the Expansion Valve orifice through the low side coil and the crank case of the compressor.

SECTION 22SCREENS

The system has Five (5) Screens:-

1. Screens "F", "G" and "H" are a part of Magnetic Valves "F", "G" and "H" shown on Figure 2, and are also further detailed on Figures 4 and 5. These will be seen to be on the inlet connection of the three expansion Valves "F",

GENERAL INFORMATION

Section 22 (continued)

SCREENS

"G" and "H".

2. Screen "K" on Figure 2 is located between the Dryer "FF" and Solenoid Valve "B" and is of secondary value and is inserted as an added precaution to prevent dirt from getting into the valves.

3. Screen "J" is a large screen in the suction line located at the Main Suction Service Valve "U". This screen is flanged and can be opened for cleaning.

All screens can be cleaned with Naptha and should be dried thoroughly before installing back into the system.

SECTION 23

EXTRA SUPPLY OF DRUMS AND REFRIGERATING GAS FREON "22"

An additional supply of Freon "22" is provided, sufficient for a Single Re-charge of the entire system. These drums are of the approved test type, and when supply of refrigerant Freon "22" has been removed, care should be taken to refill with the same type Refrigerant, Freon "22". The use of any other refrigerant will not permit the best results to be obtained, and will result in trouble in attempting to secure lowest temperatures, as are desired. The drums should be stored in a cool room temperature not over 50°C. Fittings "SS" are provided with the supply items to fit the 1/8" Freon Ports "BB" in the Service Valves of the Machine.

SECTION 24

BACK ACTING SWITCH "M", FIGURE 7

This is a Penn Back Acting Switch, which breaks contact at 10 inches. It makes contact on a 1 1/2 inch diameter. Out adjustment

GENERAL INFORMATION

Section 24 (continued)

BACK ACTING SWITCH "M"

is changed by turning the small screw "M-1" on the Contactor Arm that is hooked to the Bakelite Push Rod "M-3".

The Cutting-In point is changed by rotating the large spring that works against the bellows pin.

Rotating the large spring "M-2" Counterclockwise will lower the cutting-in.

Rotating the large spring "M-2" Clockwise will raise the Cutting-in.

SECTION 25

HI-LOW PRESSURE CONTROL "L"

Refer to Figure 9 for selection of the highest Head Pressure that would be considered safe above operating pressures. See also Figure 7.

The High Pressure Control is set with about 20 pounds differential and can be changed to break contact anywhere from 80# to 300#. Adjustment is made by turning the large screw "L-1" which works against the bellows spring. Turning clockwise will raise the cutting-out point. Turning Counterclockwise will lower the cutting-out point. The differential is set as above noted and MAY NOT BE CHANGED. It is not illustrated on Figure 8.

The Low Pressure Control has a differential adjustment of about 50 pounds range. The cutting-in point is set with the large screw "L-2" as indicated by arrow and changing the differential "L-3" will determine the cutting out point as indicated by pointer. All pounds shown on both High Pressure and Low Pressure Control are in pounds per square inch. The control is set for cutting-in at 5 pounds, and cutting out at 16 inches of Vacuum. This control will not affect temperature. It is used only to pump the machine down between cycles and shut down periods.

GENERAL INFORMATION

SECTION 26

OIL SEPARATOR "UU".

Please refer to Figure 12, which is a diagrametic sketch of this important feature of the Refrigerating System for Low Temperatures.

Facing the lower section of the Freezing unit from the front, you will find this device located to the left of the electric motor unit, standing upright, and which is marked as a Temp-Rite Oil Separator. This is a Size 3 unit with 1/2" Iron Pipe Size Inlet and Outlet with oil Return Line 1/4".

The object of this accessory is to separate Oil Vapor from the Gas Vapor under high pressure. The Two Screens break up the Oil Vapor causing it to settle in the bottom of the chamber.

The oil is then returned to the Compressor Crank Case Through a Float Valve.

The refrigerant gas passes into the condensor.

SECTION 27

MAINTENANCE

FOXBORO RECORDER CONTROLLER

PEN ARM — PENS

Removable Pen Arms

To prevent damage to pen arms, it is advisable to remove them when work on the instrument necessitates the removal of the chart disc, especially when the pen lifter has more than one arm.

To Remove Pen-Arm: Hold the pen-arm bracket (Item 11, Fig. 5823) to prevent side motion and springing out of calibration. With fingernail, knife blade or small screw driver raise the upper end of the pen-arm over the stud, at the same time sliding the pen-arm downward.

To Replace Pen-Arm: Hold the pen-arm bracket with fingers to prevent springing out of calibration. Place the pen-arm in position so that the rivet in the pen-arm will slide into the slot in the bracket, and the open end of the pen-arm will slide over the taper stud. With the pen-arm in this position, simply push it into place.

V-Pens

Caution: Do not change angle of pens from that shown in Fig 3207. Pens for a two pen instrument are shown. In a single pen instrument, the pen makes a right angle with the chart.

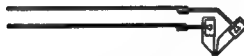


Fig. 3207

To Ink a "V" Pen: Use the dropper, and put a drop or two of ink in the pen. At normal temperatures and with ordinary records, this amount will last for days. See if the ink is feeding by drawing a piece of smooth paper across point of the pen. If the ink does not flow freely, a moistened piece of paper held against the pen point will start it.

"V" Pen Adjustment: Careless handling in transportation may alter the correct adjustment of the pen. Slip the pen in or out of the holder (it is only friction-tight) until it touches the chart. Do not bend the pen-arm to obtain adjustment. If, after long use, the pen makes a heavy line, it is wasting ink. Put in a new pen.

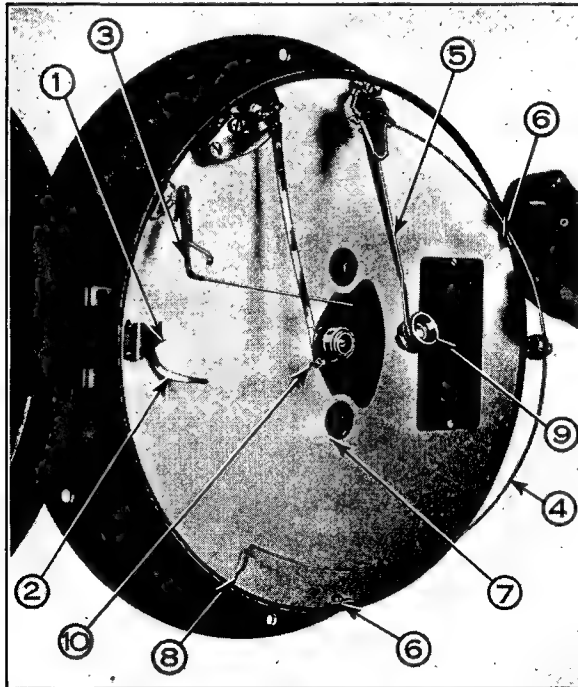


Fig. 4015

KEY TO FIG. 4015

1. Time Set Pointer
2. Guide Finger
3. Pen Lifter
4. Wire Chart Holder
5. Chart Hub Holder
6. Wedge Fasteners
7. Clip
8. Slot in Chart Disc
9. Chart Hub
10. Pen

Chart Holder (Fig. 4015)

The chart holder assembly is fastened directly to the case, but it is unnecessary to remove it when removing the chart disc or changing the chart. It consists of a rigid arm chart hub holder (5) and semi-circular wire chart holder (4). The loop end of the wire chart holder is caught in a slot (8) in the chart disc which keeps the wire chart holder in position and holds the chart flat against the disc. The chart hub (9) is held in the crook at the end of the chart hub holder (5), always in position to be snapped back on the chart hub base after replacement of the chart.

To Change Chart

Lift Pen: Place finger tip under the lever arm on the pen lifter (3) and raise the pen lifter.

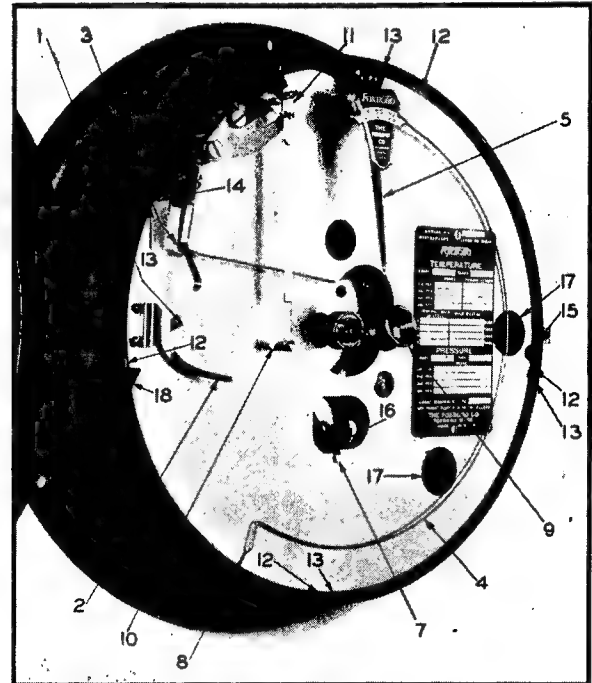


Fig. 5823

KEY TO FIG. 5823

11. Pen Arm Bracket
12. Lugs
13. Chart Disc Stops
14. Projection
15. Chart Disc Stop
16. Thumb Piece
17. Finger Holes
18. Stop

Remove Chart: Place the tips of the first and second fingers behind the knurled rim of the chart hub. Press the button in center with thumb. The chart hub will release instantly. Remove the chart.

(If the instrument contains a mechanical clock, be sure the spring is wound sufficiently to run proper period of time. *Do not wind too tightly*).

Replace Chart: Slip the chart under the wire chart holder, pen index, pen lifter, and time set pointer (1). Place hole in the chart over the collar on the chart hub base and insert the hub in the base. Grasp the hub by the knurled rim and push straight in. It will automatically snap into position. Do not press guide finger on the time set pointer toward the chart disc as this will cause the chart to stick and prevent its turning easily.

Adjust for Time: Turn the chart hub to the left until the proper time arc is indicated by the time set pointer. (Note day and night sections on chart.) Ink pen as described on the following page and close door. The pen will be automatically adjusted to the chart when the door is latched.

Time Set Pointer (Fig. 4015)

The time set pointer (1) is properly adjusted when the instrument leaves the Factory and seldom needs adjustment. It is designed for ease in accurately adjusting the charts to the desired time arc, so that it is not necessary to have the pen on or near the chart to adjust the chart for time. The guide finger (2) on the time set pointer is for the purpose of guiding the chart under the time set pointer. The time set pointer and the pen point must indicate the same time arc.

To Adjust Time Set Pointer: Place the chart on the instrument. This adjustment should be made when the pen is near the outer edge of the chart because the chart can be located more accurately when the pen is in that position. Be sure the chart disc (see below) is in position. Slightly loosen the two screws that hold the pointer to the chart disc. Turn the chart until the pen point rests exactly on the time arc. Adjust the time set pointer to indicate the same time arc. On instruments subject to overrange the time set pointer should be set so that the pen point will pass the pointer. Tighten the two screws.

Chart Discs

The wedge-fastened chart disc (Fig. 4015) is readily recognized by the odd-shaped hole around the chart hub and the two finger holes above and below the hub.

The self-locking chart disc (Fig. 5823) is readily recognized by the small egg-shaped hole around the chart hub and the finger holes (17) on the right-hand side.

Wedge-Fastened Disc (Fig. 4015): The chart disc rests on several lugs on the side of the case and is held in place by sliding wedge fasteners (6) and a notch under the pen lifter (3). It is also held rigidly below the chart hub (9) by a clip (7) which pivots on the lower clock screw. To remove the disc, first twist the lower end of the wire chart holder (4) in a counter-clockwise direction until the end loop can be pulled through the slot (8) in the disc. Turn the clip (7) slightly to the right to release the chart disc. Slide out each wedge fastener (6) with the thumb or the forefinger, grasp the free end between the thumb and the finger and push into the slotted post. Remove the chart disc with a slight outward pull to lift it over the wedge fasteners and a slight downward motion to free it from the base of the pen lifter and the chart holder mounting. To replace the disc, reverse the above operation.

Self-Locking Disc (Fig. 5823): The Foxboro self-locking chart disc rests on four lugs at (12). It is correctly positioned by stops at (13) and (15), and held in place by projections (14) and (15) and the clip (7).

To Remove Disc: First raise the pen lifter and the chart hub. Release the lower end of the wire chart holder by turning counter-clockwise until the end loop can be pulled through the slot in the disc. Catch this end around the chart hub. Push the thumb piece (16) clockwise, which releases clip (7). Grasp the disc through the two holes (17), remove with a motion to the left and then a slight outward movement to the right.

To Replace Disc: First place V-notch in the left side of disc firmly against the V-shaped stop (18) with the upper edge of the notch resting on lug (12) adjacent to stop (18). Move the disc in until it rests on the other three lugs and to the right against the right hand stop, (13) (it automatically centers itself against the other stops). Swing clip L counter-clockwise until it locks over the disc in the notch.

GENERAL INFORMATION

Section 27

FOXBORO REGULATOR

In its function for recording low temperatures on your particular unit, the use of Charts No. 798308 is made, indicating temperatures ranging from 120°C - 0 - Minus 60°C.

SECTION 28

MOTOR STARTER

The unit is equipped with an automatic motor control starter, known as the Cutler Hammer Bulletin 9586. It has a reset button in the front panel of the starter, which is to be used as instructed under the Service Analysis Section. In construction it consists of contactors for the three phase circuit, elements rated in accordance with the size of the motor, and holding coil. The elements, or thermal overload relays are already assembled in the box. Two spare sets accompany the shipment of the complete Refrigeration Unit.

SECTION 29

BOX CONSTRUCTION

The skeleton frame work of the Freezing Unit is made up of heavy duty Angle Iron, and measures 69-1/2" x 56" x 52". It is made up in two sections, an upper and lower. The lower section contains the entire refrigerating machinery complete, with suitable provision made for the circulation of air for all parts, for cool operation. All wiring so far as was practicable has been placed in the front of the machine proper, and the compressor, oil separator and motor occupying the

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GENERAL INFORMATION

SECTION 29 (continued)

BOX CONSTRUCTION

center portion. The back of the lower compartment is used merely for the connecting pipes, and the left hand portion (facing from the front) has further piping.

The Upper compartment is securely fastened to the lower section. The Freezing Chamber is located in the upper section, with inside measurements of 20" x 36" x 37". Suitable provision was made to hold one of the Interchangeable Drums purchased on your order, which is marked Item 1-15.

A lot temperature of Minus 60°C has been provided for, in accordance with specifications. The unit has been suitably built along the usual Atlas lines, and sufficient refrigeration is to be had for quickly lowering the temperature of the box to the desired degree.

The door of the Freezing Chamber is 5-1/2" thick, and the walls are adequately provided for with insulation to eliminate outside room temperature affecting the cycle of refrigeration.

SECTION 30

REFRIGERATING COMPRESSOR


From an engineering standpoint the most suitable refrigerating compressor was used in the fabrication of your unit. We will not attempt to give you all the construction details and advantages of the Compressor unit, all of which is fully described in our General Information Section in detail. The unit is known as Model SE 88, Serial 37735 SRA. Test Pressure is 250 lbs. on the High Side and 150 Pounds on the low side.

SECTION 31

STARTING THE UNIT

A. Before attempting to start the unit, we suggest that a thorough review be made indicated in our General Information with frequent reference being made to the sketches attached hereto as a guide to the various parts which are employed in starting the unit, in maintaining the desired temperatures, and the subsequent operation of the Freezing Cabinet under the most desirable circumstances.

First of all, check over the wiring and Power Supply.

Next, and an item which is extremely IMPORTANT, make certain that the motor when energized is running in the proper direction. Your unit should have the motor running in the direction so that the compressor pulley is operating in a clockwise  direction, looking in the bottom section of the box from the rear.

B. You are now ready to adjust the Valves.

1. Open Valve "U" all the way, then close it two turns. Open Valve "D" until pressure rises on low side gauge to approximately 35 or 40 pounds. Leak Test System with Halide Torch. This leak test need not be made particularly with the Halide torch indicated, but a good make should be used as a precaution.

- B. 2. Open Valves "T" and "C". If there were no leaks, Valve "D" may be opened again and system and power supply turned on. If there is a leak, leave Valve "D" closed and pump the pressure down to approximately 2 or 3 pounds, before making repairs.

C. CHECK THE CONTROLLING DEVICES

1. The High Pressure Cut-Out "L" is a Safety Device only and will stop the motor in an emergency.
2. Power for the Thermostatic Control "S" is taken from one side of the line, 220 Volts, and reduced through a Transformer "O" to 110 Volts. A second transformer "P" reduces the current to 24 Volts.
3. Thermostat "S" makes contact when satisfied. When satisfied, the relay "PP" falls into position, closing the Solenoid Valve "B", cutting in the Low Pressure Switch "L" in the motor starter circuit. When Thermostat is calling, the motor starter makes contact and the Solenoid is energized. The Low Pressure Switch is By-Passed.
4. There is an "On and Off" Toggle Switch "N" on the panel which will close the Solenoid "B" and cut in the Low Pressure Switch "L" by by-passing the Thermostat. The solenoid line passes through a Back-Acting Switch "M" connected to the Low Side. This Back-Acting Switch serves to allow the coil to cool down gradually by throttling the liquid supply. When the coil reaches a temperature corresponding to that of tan (10) inches suction pressure, the expansion Valves "F", "G" and "H" then function normally.

- D CHECK THE OIL LEVEL, through Sight Glass "GG" (See Figure 1) in base of compressor. This oil level should be about the center of the glass when compressor is off. This sight glass should be checked a second time, an hour or so later, after the box has cooled down.

- E. GREASE THE MOTOR, with proper grease.
- F. CHECK THE BELT TENSION. Belts should not be taut.
- G. SET THE LOW SIDE CONTROL "L" to cut in at five (5) pounds, and out at sixteen (16) inches of Vacuum.
- H. MAKE SURE TO REPLACE THE CAPS (or bonnets) on all Service Valves.
- J. UNLESS THE UNIT IS SHUT DOWN PERMANENTLY, the Power Switch should always be closed.

For short periods of shut down, the Toggle Switch "N" should be used. With this Switch "N" on the "Off " Position, it will still permit the Compressor unit to idle and maintain an equilibrium between the High and Low Side of the Compressor.

When lower temperature is desired, put Toggle Switch "N" on the "On" Position.

- K. It will not be possible to determine whether the unit is short of Refrigerant until after it has been in operation for a period of time, approximately four to five hours.

SERVICE ANALYSIS

Section 32

It is suggested that before consulting the following Service Analysis, the text submitted on "General Information" be read through so as to familiarize yourself with the general structure. In the event any difficulty is experienced a competent service man should be consulted, before attempting to do any repair.

The following items should be checked: when

A. NO REFRIGERATION

1. UNIT NOT RUNNING

- a. Check the Power Supply.
- b. Motor Overload Switch may be off; Push Red Button on Motor Starter.
- c. Check motor to see if it is operative.
- d. Check the grease in motor.
- e. Check the Belt. It may be broken, or it may be off.

2. UNIT IS RUNNING

- a. Refrigerant charge leaked out. FIND THE LEAK AND RECHARGE with Freon 22
- b. Check the Compressor Valve Plate (See Section 5 on General Information).
- c. The Expansion Valve may be plugged with moisture or wax. Moisture may be in the system if it is opened frequently and will deposit at the orifice of the expansion valve. If improper oil is added, wax may separate and plug the valve. Remedy, Clean the Valve.
- d. Expansion Valve may be defective, and will so indicate when
 1. Unit runs on a vacuum as in 2-d-3 above, due to
 - a. Plugged strainer. Remove and Clean
 - b. Plugged valve orifice. Clean Valve.
 - c. Leak in Control bulb or diaphragm. Replace Valve.

SERVICE ANALYSIS

Section 32

(as continued from previous page 23)

- d. Expansion Valve may be defective, and will so indicate when
2. Unit runs on high suction pressure and the compressor is cold due to the expansion valve overfeeding liquid, due to the valve held open because of dirt particles or a damaged valve seat.

Clean or Replace Valve.

B. INSUFFICIENT REFRIGERATION

1. Pressure Control not properly set. Check the temperature setting. After the unit has pulled down to the desired temperature, the control setting should be checked.
2. Refrigeration load is too great. Usually caused by adding excessive quantities of warm product. Check with the operator.
3. Air cooled condensers plugged with dirt. Keep condenser clean. Use a long bristle brush or vacuum cleaner.
4. Air in the system. Purge. Leak test. Then check charge.

C. RECOMMENDED SERVICE OPERATIONS

1. LEAK TESTING.

Use a Halide torch, or equal, as per directions on the particular make of torch. Do not hurry this operation. Small leaks take several seconds to show flame color, after applying tube to the suspected joint. The presence of oil around a joint usually indicates a leak.

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C. Recommended Service Operations Procedure

2. DISCHARGING REFRIGERANT FROM SYSTEM

- a. Connect a drum to the Discharge Gauge fitting of the compressor. The drum must be empty and evacuated, or have sufficient space to receive the charge. The connecting line must be at least ten (10) feet long, and must have a gauge T'd into the line.
- b. Close the compressor discharge service Valve all the way into the right.
- c. Pump out the system into the drum by running the unit intermittently so that the drum does not overheat. If necessary, run a little water or place wet rags on the drum so that the temperatures are kept low enough to avoid melting the fusible plug on the drum. Cool drum by placing in tub of cold water at about 50° C.
- d. When a gauge on the compressor suction service valve registers a full vacuum, the system is pumped out.
- e. Remove drum and pump a vacuum on the system with a discharge service valve gauge fitting open to remove last traces of Freon 22 Refrigerant from the system.

3. CHARGING REFRIGERANT

- A. Connect a drum of clean, dry, oil-free refrigerant to the compressor Suction Gauge connection by means of a charging line, or 1/4" O D tubing. Be sure there is no air in the system. Before tightening the flare nut on the charging line (refer to Section 19) on the valve connection of the compressor, open the drum valve slightly which will blow the air out of the line. Run the unit with the compressor suction service valve screwed all the way in, for fast charging. Whenever

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possible, weigh the charge in, standing the drum on a scale. The drum should be upright to admit gas, never Liquid, to the unit.

- b. Before completing the charging, back the service valve out to admit refrigerant to the low side to obtain normal operation before checking the charge. This unit has a TEST COCK which indicates the correct charge. Open the Valve, and be sure a spray of cold, clear liquid comes out. If gas or oil are discharged, continue adding refrigerant. The charge for this machine is thirty (30) pounds of Freon 22 Refrigerant. The drum can be placed in a bucket of warm water to hasten gas flow.

4. PURGING AIR FROM SYSTEM.

Install a 1/4" Purge line from the Discharge Service Valve Gauge connection into a waste bucket. Run the unit a few minutes until condenser is warm. Stop the unit and immediately open the discharge service valve to allow the air and gas to blow out freely. The valve must be left open until head pressure becomes normal. This may require several blows of about ten (10) seconds each, also some liquid or oil may blow out. After purging, check to see if the unit has enough charge.

5. CHANGING OR CLEANING EXPANSION VALVES.

Close the Liquid Receiver Service Valve "D" and pump the system down if possible. If the cabinet is warm, open the Liquid Receiver Valve slightly above one (1) pound. Never open the system when the suction gauge shows a VACUUM. If necessary, attach a drum of refrigerant with a gauge in the line to the suction service valve, and admit enough gas to bring the pressure above one (1) pound. Never allow

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the system to remain open; immediately plug all open lines. This is to keep the system dry. Never remove a valve until all frost and moisture has been warmed off.

- b. After tightening connections, admit enough refrigerant pressure into the lines and remove plug or gauge from compressor Discharge Service Valve to purge air out.
- c. When installing a new valve, be sure the capillary tube does not touch any suction lines, or very erratic operation will occur. Install the bulb in a similar manner to the one removed, as any change in location is apt to throw the system out of balance.
- d. To clean expansion valve, remove it as above indicated, and blow it out with Freon 22 from a drum. If the screen is plugged, remove and clean in naphtha or high test gasoline; dry, and then replace. If moisture was causing the stoppage, the Silica Gel Dryer should be removed and replaced.

6. CHANGING COMPRESSOR OR VALVE PLATE

- a. Pump down as instructions indicate in Section 17. When pressure is balanced, close compressor Service Valves. Remove cap screws from valves.
- b. After repairs are made, run unit to secure a vacuum on crankcase and see that it holds when compressor is stopped (Refer to Sect. 5).
- c. Admit slight amount of Refrigerant by Cracking liquid receiver valve and opening suction service Valve "T" until gas blows freely from compressor discharge plug opening.
- d. Open Liquid valve and start unit. If the valve plate or seal requires replacement, the general procedure is identical to the above.

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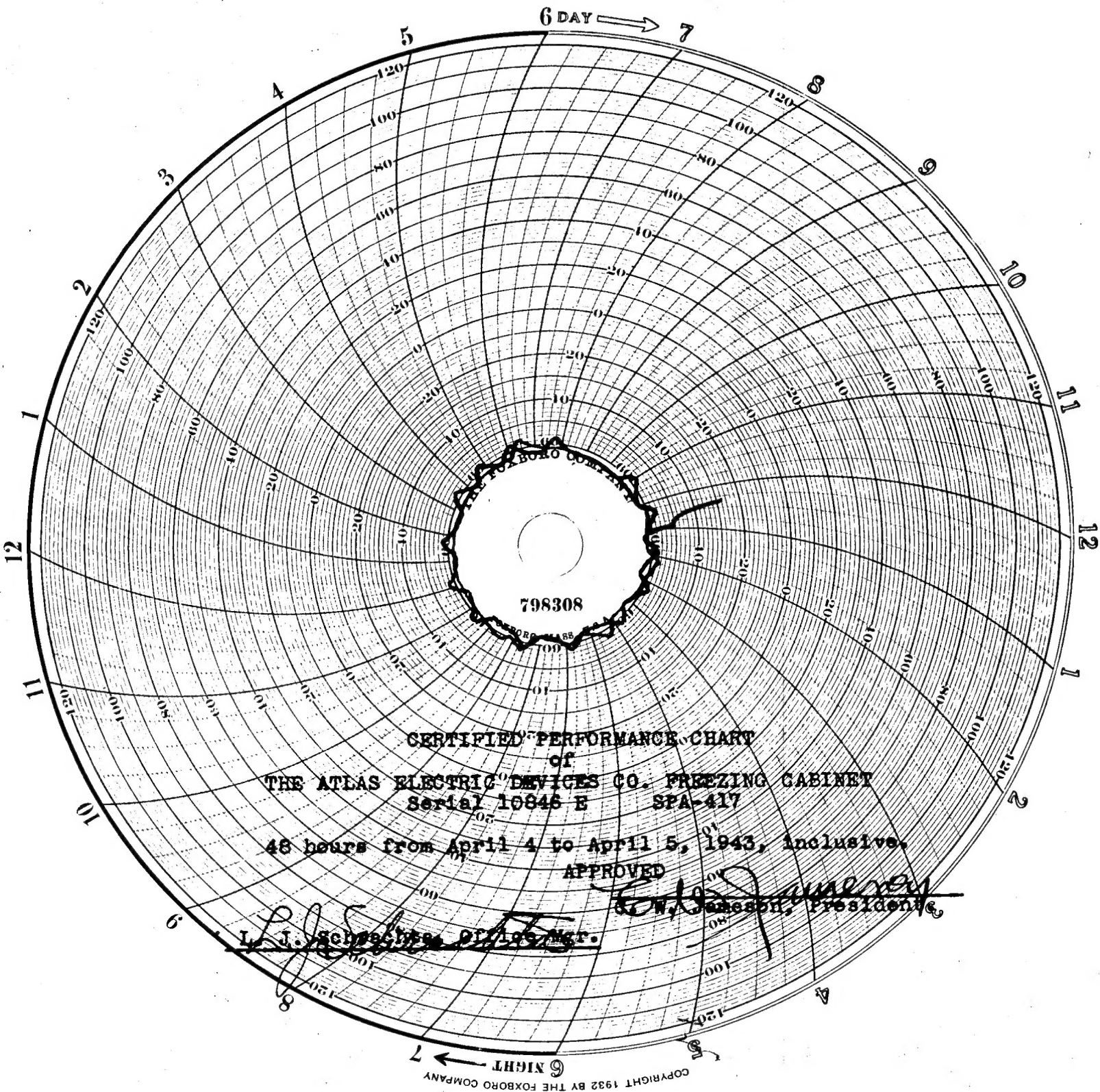
THE FREON REFRIGERANT SYSTEM

Laboratory and field tests over a period of several years have proven that Freon Refrigerant "22" has many important advantages over Freon "12" as a low temperature refrigerant.

This is because the suction pressures are higher.

Therefore, condensing units are capable of more refrigerating capacity with Freon "22" than with Freon "12".

Refer to Figure 10.



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